NEW

Home Computing WEEKLY

asp
Argus Specialist Publication

May 17-23, 1983 No. 11 38p

INSIDE

Programs to type in for: Dragon-32, ZX81, Spectrum, BBC, TI 99/4A

Software reviews for: VIC-20, BBC, ZX81, Spectrum

Best seller charts for: ZX81, VIC, Dragon, Spectrum

CLASH OVER MICRO CLUBS

Two clubs for owners of the Oric-1 computer are set to clash — even before the new group is launched.

Now Alex Cross, who is setting up the new club, is seeking a meeting with Bob Green, who runs the Tangerine Users' Group.

Mr Cross, 46, said he had Oric Products' consent and expected to have 10,000-15,000 members by the end of the year. He is director of Wembley-based Oric dealers Micro Computers Incorporated.

TUG began three-and-a-half years ago and says 40 per cent of its 5,000 members own Orics.

Mr Cross said: "One could say that Mr Green has not got an official club, but everyone sets them up. I want to get in touch with him because obviously there's conflict here."

Could he see a clash looming?

He said: "This is one of the reasons why I'm particularly hesitant about saying what we are doing to do as a club.

"It's ethically better that we get in touch with Mr Green.

EXCLUSIVE

We don't deliberately want to have a conflict of ideas and a conflict of interests.

"I want to see if we can co-operate and if we can draw some parameters so we do not clash.

"What is clear is that there is a grey area here and we want to resolve this before we reach the user.

"The fact that there is a confusion between Tangerine and Oric Products International is something that happened at birth. Tangerine being the designers of the Oric."

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ARCADIA SCHIZOIDS
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WAITERS SNATCHA
MOLARMAUL
AH DIDDUMS FRANTIC

QUALITY
imagine
...the name of the game
SOFTWARE

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Sound of software

It looks just like any other 45rpm single and when you play the A side it sounds like one too.

But flip it over and Chris Sievey's new release is also three programs for the ZX81.

One of them displays the lyrics so fans can sing along with the A side, a pop-rock number called Camouflage.

The other two programs are 16K and 1K versions of a game called Flying Train.

And almost all of the single was put together by Chris, a 27-year-old part-time petrol pump attendant.

By using a studio's multi-track recording machine, he plays eight acoustic guitars, four electric guitars, two base guitars and a grand piano as well as singing.

The two other vocalists are his wife Paula, 28, and their

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Best for software — every week

WE'VE PICKED THE BEST, FORGET THE REST! SPECTRUM/ZX81

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48K SPECTRUM ONLY

LET 'E.T.X.' TALK TO YOU The clearest speech we've ever heard in this *"adventure/graphic arcade game utilizing every byte of computing power in the Spectrum" (Abbex).* Enchanting graphic adventure: 16 landscapes: 1400 power zones: 4-levels: 16-page on-screen manual: up to 9 players: it's amazing what a Spectrum can do. (Abbex) £5.95

TRANSYLVANIAN TOWER *"Enthralling and addictive" (PCW). An excellent game at a reasonable price" (PCN).* Stunning 3D graphic adventure. Fight (and shoot) your way through the 500 3D rooms in Count Creepie's castle. Combines adventure and arcade games with great skill. We can't give it up! (R. Shepherd) £6.50.

KNOT IN 3D Brand new mind-boggler from the author of 'Escape' and 'Tunnel'. Absolutely brilliant. Untangle yourself - or get knotted. Avoid collisions: worry about the chasers as you roam through an apparently empty 3D space. But is it? Are you? (New Generation) £5.95

BLACK CRYSTAL *"An excellent graphics adventure" (S. User).* The massive 180K of program, 'loads' from 2 cassettes in 6 chapters. You must solve each of the 6 stages to defeat the Lords of Chaos. Real-time monster battles, 16 command keys. Instruction manual, (Carnell) £7.50

THE HOBBIT *"Takes first place for quality and value for money" (S. User) "A marvellous game... should set the standard" (ZX Comp).* Free 285 p illustrated book contains clues to help you. 30 beautiful full-screen pictures; 500 word vocabulary; 16 page instruction manual: it took 4 people 18 months to write! (Melbourne House) £14.95

PENETRATOR *"The graphics are truly impressive... definitely in the top 5" (CVG).* The most sophisticated 'SCRAMBLE' ever. Demo. Training programs. Plus amazing Customizing Mode lets you build your personal 'Scramble'. Write your own unique arcade game - without all the effort! (Melbourne House) £6.95

GREAT BRITAIN LTD *"About as complex as such a program can be... excellent value for money" (Which Micro?).* Choose your party and run the country. Watch what happens as the results come in on election night. Even plays Rule Britannia. (Hessel) £5.95

PIMANIA *"Amusing and brilliant... the graphics are excellent" (S. User).* A wonderfully witty adventure, great graphics and music and you could win the £6,000 Golden Sundial of Pi. (Automata) £10.00

ANY SPECTRUM

FROGGY The best frog there is, we reckon. This game uses so much memory, you even have to unplug your printer. Loads in 2 parts. As you get better, the game gets harder. Just great. (DJL) £5.95

ARCADIA *"Stunning graphics have no equal" (S. User). "In the top 3 arcade games" (ZX Comp).* The most aliens you've ever met. Move in 4 directions to avoid them. Choose your own keys. Incredible. (Imagine) £5.50

INVASION FORCE Stop the invasion by blowing away the bomb ship by shooting through the force field. Suicidal game option. (Artic) £4.95

MINED OUT *"It is impossible to fault... maddeningly adictive" (PCN).* Just crawl across a mine field to rescue Bill. Bonuses for speed and for damsels. Watch out for walking mines. Action replay drives you crazy. (Quicksilva) £4.95

COSMIC GUERILLA Yet another mind-bending variation on Invaders. 4 game options: 6 skill levels for each gives you 24 games in 1. Will make your wrist ache. (Crystal) £5.50

AIR TRAFFIC CONTROL If you've outgrown your flight simulator, get in charge at Heathrow. Land your planes safely. Watch out for rogues. 6 skill levels, plus demo. (Hewson) £5.95

WINGED AVENGER *"Hard to beat" (CVG). "One of the best Sinclair games so far" (PCW).* Very fast 'PHOENIX'. 7 play levels, 3 attack waves, laser shield: mothership with smart bombs. A best-seller. (Work Force) £4.50

3D TUNNEL *"Superb graphics and game presentation" (CVG).* Fly down the winding 3D tunnel, shooting bats, spiders, frogs and rats. Demo mode: 3 speeds: training program for each phase. (New Generation) £5.95

3D TANX Shoot the enemy tanks from your moving 3D turret. 3 play levels: accurate ballistics: 1 or 2 players: pause: demo game: training program: even plays God Save The Queen. (DK'tronics) £4.95

FAUST'S FOLLY The first adventure we've seen that's worth playing in 16K. It's great and it's graphic! Loads in 2 parts: clear instructions: then a smashing adventure with directions, inventory, look, score, save. (Abbex) £5.95

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QUEST
'THE BLACK HOLE'
Highest schore received to date 963 by Darren Gerald of Christchurch, Dorset.

Continued from front page

TUG's assistant managing director Kevin Phillips, 23, said: "It's the first I've heard of it.

"He can complain until he's blue in the face but there's nothing he can do to stop us. I don't know how he's going to get on, but we've got the edge on him.

"Every day we get dozens of applications from Oric owners and it's picking up very quickly.

"I don't see why we can't get on side by side, but if he's out to take our members he's got a battle on his hands. Good luck to him, as long as he doesn't start treading on our feet.

"He's quite welcome to come for a chat, but I don't think we need to take any action. We already have the foundation. Can he provide what we are able to?"

Mr Cross said his launch date would be in June or July and that, although it would generate "a degree of revenue" for MCI, it would act independently of Oric Products in representing its members.

He planned to hire more staff and to offer membership at £5-£8 through mailing all users on Oric's list and with leaflets inside Oric packaging. There would be a news sheet, starting as a bi-monthly, and offers like inexpensive software. He was also intending to talk to Paul Kaufman, head of Tansoft and editor of a new magazine called Oric Owner.

TUG was formed by Mr Green for owners of the Microtan. Mr Green was unable to comment as he was on holiday with his wife, Vera, the group's administrative director. As well as Mr Phillips, there is a fourth staff member, Colin Nowell, who looks after software.

Mr Phillips explained how they came to include the Oric: "There are machines around but very little available for them — software, add-one and the

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Argus Specialist Publications Ltd.
145 Charing Cross Road, London WC2H OEE. 01-437 1002

Home Computing Weekly is published on Tuesdays. Distribution by Argus Press Sales and Distribution Ltd, 12-14 Paul Street, London EC2A 4JS. Printed by Alabaster Passmore & Sons Ltd, of London and Maidstone, Kent. Design and origination by MM Design and Print, 145 Charing Cross Rd., London WC2H OEE

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Continued from column 1

rest. As it came from the same stable and there was a demand we decided to include it.

"As to not being official, the only thing in which we are not official is that we are not recognised by the manufacturer — we don't carry their name. In all other respects there's nothing to complain about. We do business very fairly.

"If we think anyone has produced a load of rubbish we will say so. If you are an official group you have to be careful because it would be like cutting your own throat."

His members paid £15 a year and received a 20 to 24-page monthly newsletter, 50 per cent devoted to the Oric, which included programs to type in. Four software packages were on offer at £5.50-£6.50 with another eight to come soon.

A spokesman for Oric Products said there had been no official agreement with Mr Cross and a decision was unlikely before Oric executives returned from a business trip to America.

She said: "They've been talking, but nothing's been signed, sealed and delivered."

Apart from initial help in setting up the group, Oric did not plan to involve itself — it would be a totally independent group.

Tangering Users' Group, 1 Marlborough Drive, Worle, Avon BS22 0DQ
Micro Computers Incorporated, 5 Watford Road, Sudbury, Wembley, Middx

Honestly, officer

You can break most known driving laws with Hazard Run, a new Atari game from Allrian. It allows you to smash through brush, leap ponds and drive on two wheels. Price for the cassette is £21.50.

Allrian, 1000A Uxbridge Road, Hayes, Middx UB4 0RL

ZX81 16K **SPECTRUM** 16/48 **DRAGON** 32 **TANDY** LEVEL 2 **BBC** A/B

AWARI

★ The ancient African game of logic. It takes 2 minutes to learn the rules but far longer to master the tactics.

★ Select the 'Goat-herd' level of play and it's an addictive game for children (8+) that exercises their minds – not their laser fingers.

★ Select the 'Witch-doctor' level and it's a threat to your sanity. We haven't beaten it and we wrote it!

ADVENTURE

★ Over 200 places to explore in this machine code game using advanced data compression techniques.

★ No random elements – you will need skill, cunning and a sense of humour as you explore caves, forest and castles.

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DEALER ENQUIRIES WELCOME

Continued from front page

Chris Sievey — singing software

babysitter, 22-year-old Winifred Stack, who looks after Stirling, 4½, and 3½-year-old Asher. And a friend, Mike Doherty, plays the drums.

Chris said the idea of using the B side for programs came to him after he bought a ZX81 two months ago planning to use it to put titles on a video tape of a group called Freshies.

He said: "I used the B side because they are disposable — people are sold on the A side of a record."

In fact, he says this is his 15th single since he started recording in 1976. Just three had crept into the botton of the top 100, inlcuding his personal best-seller, which sold 40,000, called I'm in Love with the Girl on the Manchester Virgin Megastore Check-Out Desk.

He said he was having 2,000 copies of Camouflage pressed, under his own Random Records label, to start with.

After leaving school, said Chris, he went to art college to study film making — for three days. He said: "I arrived on my first day with all my scripts and I found it was going to be 18 months before they put a camera in my hand. I couldn't wait."

Since then he reckons he has had 20 jobs, mostly sweeping up, packing, serving in shops and working as a silk screen printer.

After 14 records wasn't it time he gave up?

Chris said: "I'm not deterred. I love doing it. And I think with software on one side it has increased the chances because there are two markets. But if it flops I'll move onto the next one.

"But obviously I want to develop it so I'm thinking of doing something for the Spectrum next."

He said that to use the single, due out on Friday at £11.15, the B side had to be loaded into the computer from a record player's headphone socket or copied onto tape and then loaded.

And he said a major distributor was interested in marketing the record.

Random Records, 3 Moorside House, Oakleigh Court, Timperley, Cheshire WA15 6UG

Eugene's driving ambition

Teenage programmer Eugene Evans is in line for a £6,000 company car — providing he passes his driving test.

Image Software has just bought Escort XRIs for four staff, but Eugene, just 17, will have to wait. He takes his test next month.

New general manager Bruce Everiss said that if it was not for his age Eugene, who heads Imagine's team of programmers, could have had a more expensive BMW.

Mr Everiss said: "We would but him something a lot better, but insurance would cost a lot more. Our insurance broker said it just wasn't viable."

One of the partners in Liverpool-based Imagine, Dave Lawson, takes delivery of a Ferrari Mondiale, worth around £34,000 with the extras, in August.

The other partner, Mark Butler, drives a BMW 735i Special Equipment and Mr Everiss has a Ferrari 308 GTS.

Explaining the choice of cars, Mr Everiss said: "We are a dynamic industry so we all drive dynamic cars. And we like to look after people."

Imagine Software, 28 Exchange Street East, Liverpool 2

Same printer, different name

Oric's printer will almost certainly be the £149 Tandy colour printer/plotter with a different name on the front.

After looking at several models, Oric Products is believed to have settled on the one marketed by Tandy and made in Singapore. And the price may well be less than Tandy charges.

The printer uses six special ballpoint pens — three black and one each of red, blue and green — at £1.69 for three, and 4½in wide plain paper, costing £3.99 for three rolls.

It will print at up to 80 characters per line.

Oric Products International, Coworth Park, London Road, Ascot, Berks SL5 7SE

Microfair moves to Ally Pally

Visitors to the June 4 ZX Microfair will find the conditions a lot less cramped than last time. The fair is to be held at London's Alexandra Palace — the city's third largest exhibition hall, with over twice the space of the previous site.

Organizer Mike Johnston is however hoping the extra room will be filled up with larger crowds — there were over 8,000 people at the last Microfair — and move stands.

Once again, the show will feature a computer chess tournament.

ZX Microfair, 71 Park Lane, Tottenham, London N17 0HG

The 3T27 cassette recorder

Recorder for computers

New from Ferguson is a computer-compatible cassette recorder, the 3T27, which will be on sale from this month for around £25.

It runs on batteries or mains, and features automatic recording level control, a tape counter, built-in microphone, auto-stop and pause control.

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Fun and games with the TI-99/4A and others

If you own a Texas Instruments TI-99/4A and you want to have fun, I can recommend the following game to you. It is called Henhouse, and is available in cartridge form from Funware Inc., 405 N. Bowser Bldg. A, Richardson Texas 75081 (214) 680-8298.

When the game starts, a graphics screen displays a henhouse to the right center of the screen with several chutes. At the bottom of the screen is a farmer (you, the player).

The fun starts as the hens begin to lay eggs. If a chute fills up, you have to catch the eggs before they hit the ground and break. That is easy. Using two of the keys or the remote control unit you can get the farmer to run back and forth.

Soon the plot thickens. A wolf and a human poacher arrive on the scene at various times to eat the hens and steal eggs, respectively. You must get the farmer to the shed to pick up his trusty rifle and shoot the intruders.

Also birds are flying by which the farmer can shoot. Unfortunately, the farmer can't shoot and catch eggs at the same time, which means the gun must go back to the shed before more eggs can be caught.

If you drop six eggs or you allow the wolf to get into the henhouse, the game ends. Otherwise you accrue points for shooting birds (50 each), shooting poachers (200 each), loading an egg into the truck (20 points), and for every 5000 points you accrue you get credit for one broken egg. It really is a fun game — the first I have ever played on the TI.

It costs about $40 over here, and I believe may be distributed through Centersoft over your way. These same people also market (or will soon) the following games: Rabbit Trail, in which you help the rabbit crawl through holes and collect carrots while trying to escape assorted natural enemies on seven different screens; Ant Colony, in which you as an exterminator, descend into the colony armed only with a spray gun (as a frustrated gardener this gives me nightmares); and Cave Creatures, wherein you get a laser to wipe out the creatures before they encircle or have an opportunity to multiply.

These games range in price from about $30 to about $43, and will all be available on the TI by the end of July.

* * * *

Here's a game for you VIC-20 users. It is called Sword of Fargoal, comes on cassette tape, costs $29.95, and is available from Epyx, 1043 Kies Ct., Sunnyvale CA 94086, (408) 745-0700. It requires a 16K expansion module, and uses joystick and keyboard control.

As you might guess from the title, this is an adventure game, and is apparently one of the best of its type. It creates a maze pattern of dungeons with each new game, and there are at least 20 levels of dungeons to explore. Each one is different from all the others.

Also, you are pitted against a variety of randomly generated monsters, of which the human types are the most clever. You have an assortment of potions, spells and other aids to help you out of tight spots.

The point of the whole thing is to obtain the sword of Fargoal and escape intact. No one I know has done this so far. If you like this sort of game involving complex dungeons, assorted "dragons" and have a few nights free, you will enjoy one of the best games of its type available on any machine. This one gets four stars in all respects.

* * * *

The Japanese haven't been idle. Sanyo showed a 99-dollar computer quite similar to the TI-99/2, using a Z80A chip. Although three versions were shown, only two will be released here.

They are the two advanced models, the PHC and 25, both with Tiny BASIC built in. The 25 also has special function keys, graphics capabilities and a music synthesizer.

Mattel has just announced its Z80A-based Aquarius computer with a $200 list price. Among other things it offers CP/M compatibility, has 8K of ROM, 4K of RAM expandable to 52K with add-on memory cartridges, a 49 key "regular" keyboard, upper and lower case, 256 character graphics, 40 x 24 display, 320 x 192 graphics resolution, and 16 colours.

Optionally available are the Logo language, as well as various program cartridges, data cassette recorder, and a 40 column printer. It is about 13in by 6in by 2in and weighs a bit over 4lbs.

It seems like a good deal offered by a company whose main income has been generated by toy sales as well as their own video game player. Not bad for the first time out.

* * * *

Now for a few software announcements and game reviews. Want a decent word processor for your VIC-20 or Commodore 64? Try Quick Brown Fox selling for $65 from the company of the same name, 548 Broadway, New York City, 10012, (212) 925-8290.

***Submarine Commander** in ROM cartridge for the Atari 400, 800 and 1200. Marketed by Thorn/EMI (I guess you might have heard of them), $4.95. Excellent graphics, game plan, and sustained interest. Works with joystick and keyboard, requires minimum of 16K RAM. As commander of a WWII sub, you try to sink all enemy ships in the Mediterranean. Good Luck.*

***Escape from Vulcan's Isle**, on disc for the same machines as above. Marketed by Epyx, 1043 Kies Ct., Sunnyvale CA 94086, (408) 745-0700, $39.95. Excellent graphics and game plan, above average sustained interest. Works with joystick and keyboard, requires Atari BASIC cartridge and at least 40K. An above-average adventure game whose goal is trying to get a shipwrecked sailor off an island while avoiding various creatures such as demons, satyrs, and Med Flies (made in California, of course) who are all bent on destruction. One of the best features allows you to interrupt the game, and save it on disc for resumption later.*

***Video Vermin**, on cartridge for VIC-20. Available from United Microwave Industries, Inc., 3503-C Temple Ave., Pomana CA 91768, (714) 594-1351, $49.95. Minimum resident memory and joystick required. This game offers excellence in all three categories, graphics, sustained interest, and game plan. Similar in concept to the arcade game Centipede. As the gardener, you attempt to rid your garden of various vermin such as ants, beetles, spiders and snails. As you wipe out the vermin, mushrooms grow in their place to block your shots. One of the best VIC games so far.*

***Airstrike**, on cassette or disc for the Atari machines, by English Software Company, P.O. Box 3185, Redondo Beach CA 90277, (213) 372-3440, $39.95. Excellent graphics and sustained interest, above average game plan. Requires joystick and 16K. Similar to the arcade game Scramble, in which you pilot your rocket ship at the same time trying to sheet out and bomb out the enemy without being destroyed first. The game is being advertised as being very very difficult, and it lives up to its promise. Some of the difficulty lies in trying to press the two firing buttons while trying to navigate. It also offers formidable obstacles to fly around. An excellent effort from a new company. One of the better games available for the Atari machines.*

More from Stateside next week.....

Bud Izen
Fairfield, California

2,000 sales 'in one day'

Add-on makers Cheetah Marketing says it sold 2,000 32K RAM packs for the 16K Spectrum — on the day it was launched.

Designed to avoid wobble and priced at £39.95, the company says it is the only one available and that it is fully compatible with all other Spectrum accessories.

Cheetah, which claims to beat any price, says the new RAM pack will soon be on sale in shops. Until then sales are by mail order only.

Cheetah Marketing, 359 The Strand, London WC2R 9HS

Top Ten programs for the ZX81

1	Flight Simulation	Psion (1)
2	QS Scramble	Quicksilva (6)
3	Monster Maze	New Generation (2)
4	Galaxians	Artic (3)
5	Mazogs	Bug Byte (9)
6	Space Raiders	Psion (7)
7	Chess	Psion (4)
8	Avenger	Abacus (10)
9	Night Gunner	Digital (–)
10	Asteroids	Silversoft (–)

Compiled by W. H. Smith. Figures in brackets are last week's positions

Top Ten programs for the VIC-20

1	Panic	Bug Byte (2)
2	Wacky Waiters	Imagine (5)
3	Asteroids	Bug Byte (6)
4	Arcadia	Imagine (1)
5	Cosmiads	Bug Byte (4)
6	Blitz	Commodore (7)
7	Amok	Audiogenic (3)
8	Alien Blitz	Audiogenic (9)
9	Choplifter	Audiogenic (8)
10	Race	Commodore (10)

Compiled by Boots. Figures in brackets are last week's figures

Top Ten programs for the Dragon-32

1	Donkey King	Microdeal (1)
2	Planet Invasion	Microdeal (3)
3	Space War	Microdeal (4)
4	Dragon Trek	Salamander (5)
5	Defense	Microdeal (–)
6	Alcatraz	Microdeal (6)
7	Chess	Dragon (9)
8	Golf	Audiogenic (–)
9	Wizard War	Salamander (8)
10	Escape	Microdeal (–)

Compiled by Boots. Figures in brackets are last week's figures

Salamander spreads its wings

Salamander Software, best known for its Dragon 32 programs, has announced that it is branching out into software for other machines. At the same time, it is bringing out a range of new programs for the Dragon — and selling them further afield.

Five of Salamander's established Dragon range — Dragon Trek, Wizard War, Grand Prix, Vulcan Noughts and Crosses and Games Compendium DI — are on sale in Boots now.

And the company is hoping that Boots will take the four new programs — Star Jammer, Salamander Graphics, Night Flight and Superskill Hangman — before too long.

On a more exotic note, Salamander's games will soon be sold in France, Italy and Israel. The original Dragon games have already been translated into Spanish.

The complete Salamander range of ten programs are all available now for the 32K Tandy Colour Computer. But the company has bought out two completely new games for the Oric-1: Trek, and a four-game compendium, which were launched at the Midland Computer Fair last week. The games were produced in conjunction with Oric Products, and will be marketed jointly.

Salamander Software, 27 Ditchling Rise, Brighton, Sussex BN1 4QL

Now for the BBC

Well known for its Spectrum and ZX81 best sellers, Psion has produced its first two cassettes for the BBC micro.

They are Vu-Calc and Vu-file, at £14.95 each mail order, which are already available for the Spectrum.

Psion, 2 Huntsworth Mews, Gloucester Place, London NW1 6DD

Micros for all

Introducing Computers, a new book by computer journalist Malcom Peltu, is designed for anyone — from child to pensioner — who wants to know about computing, says the National Computing Centre, which is publishing it at £5.50.

National Computing Centre, Oxford Road, Manchester M1 7ED

Top Twenty programs for the Spectrum

1	Flight Simulation	Psion (1)
2	Hobbit	Melbourne House (2)
3	Transylvanian Tower	Richard Shepherd (9)
4	Penetrator	Melbourne House (3)
5	Night Flight	Hewson (13)
6	Horace Goes Skiing	Psion /M. House (5)
7	Hungry Horace	Psion/M. House (7)
8	VU-3D	Psion (4)
9	VU-File	Psion (6)
10	Chess	Psion (10)
11	Arcadia	Imagine (12)
12	Planetoids	Psion (14)
13	Planet of Death	Artic (8)
14	3D Tanx	dk'tronics (15)
15	Schizoids	Imagine (11)
16	Galaxians	Artic (17)
17	Sentinal	Abacus (–)
18	Football Manager	Addictive (20)
19	Escape	New Generation (19)
20	Ground Attack	Silversoft (16)

Compiled by W. H. Smith. Figures in brackets are last week's positions

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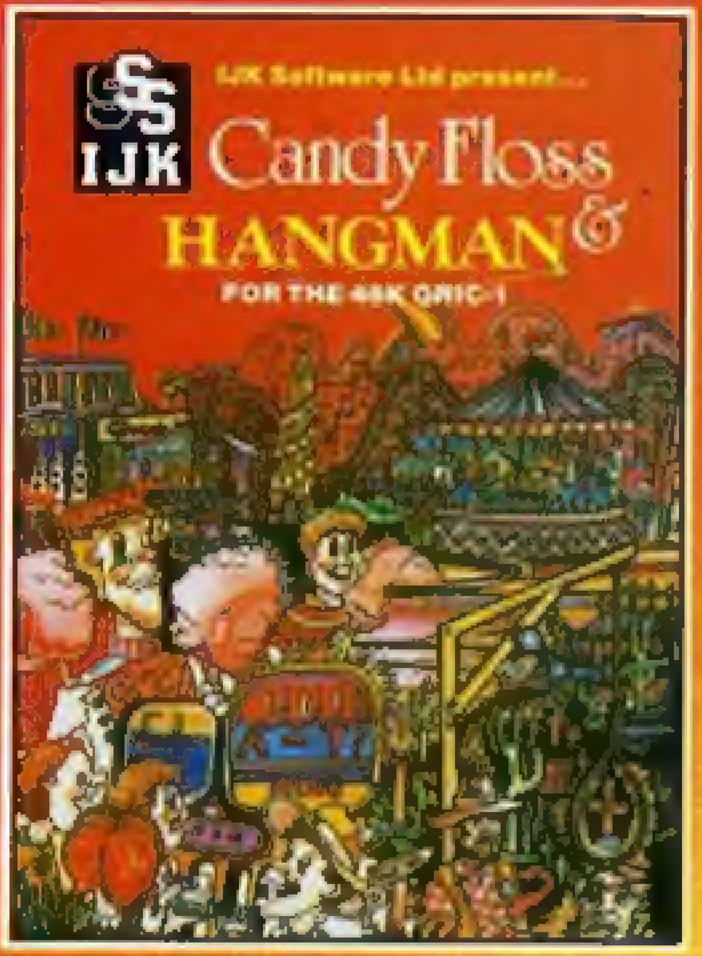
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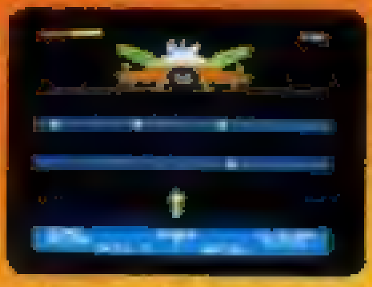

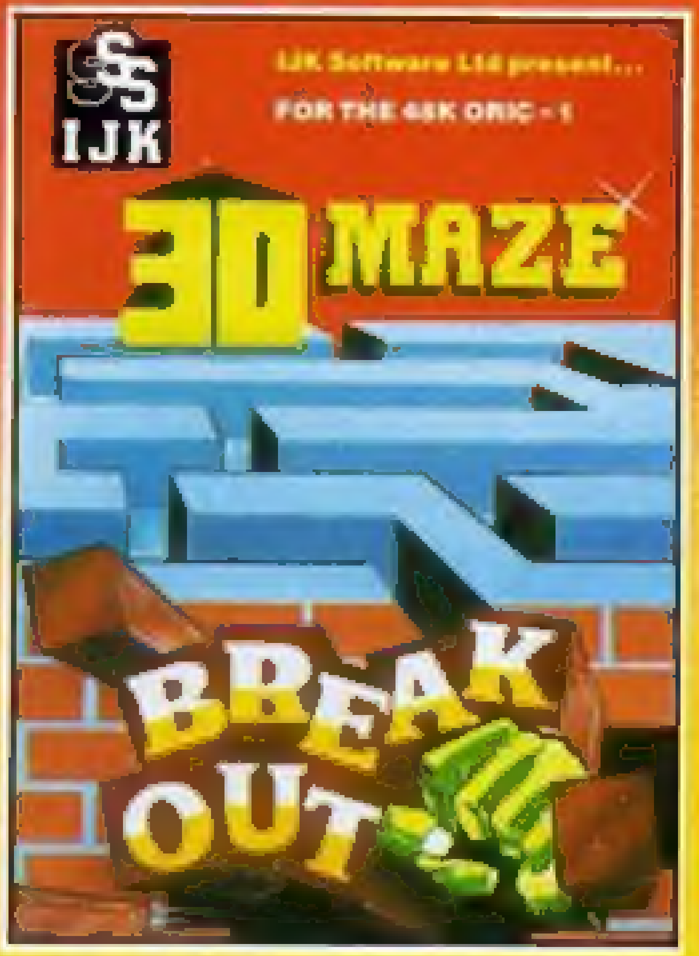
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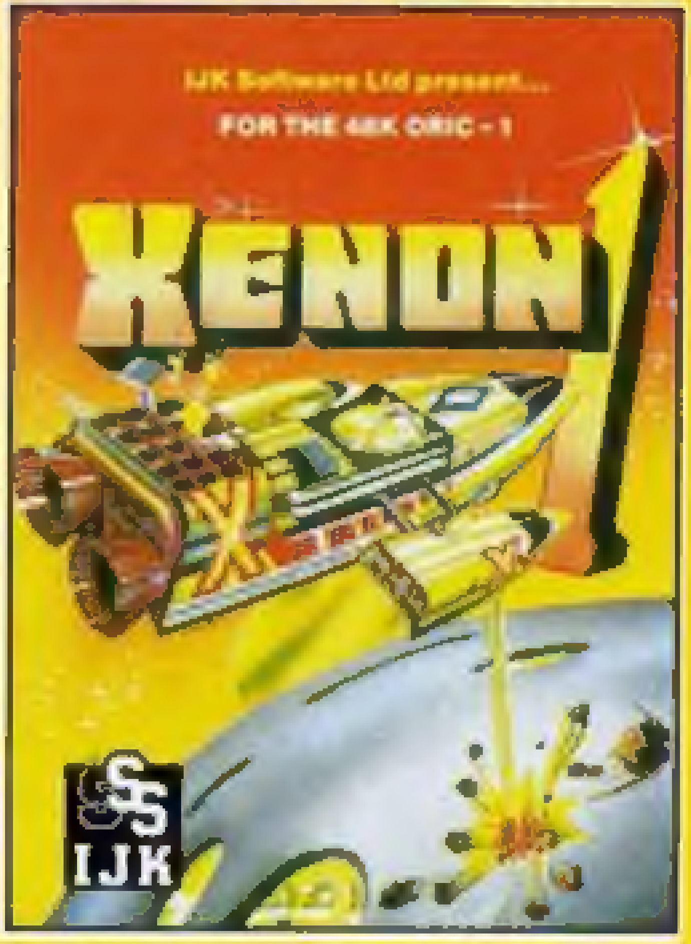
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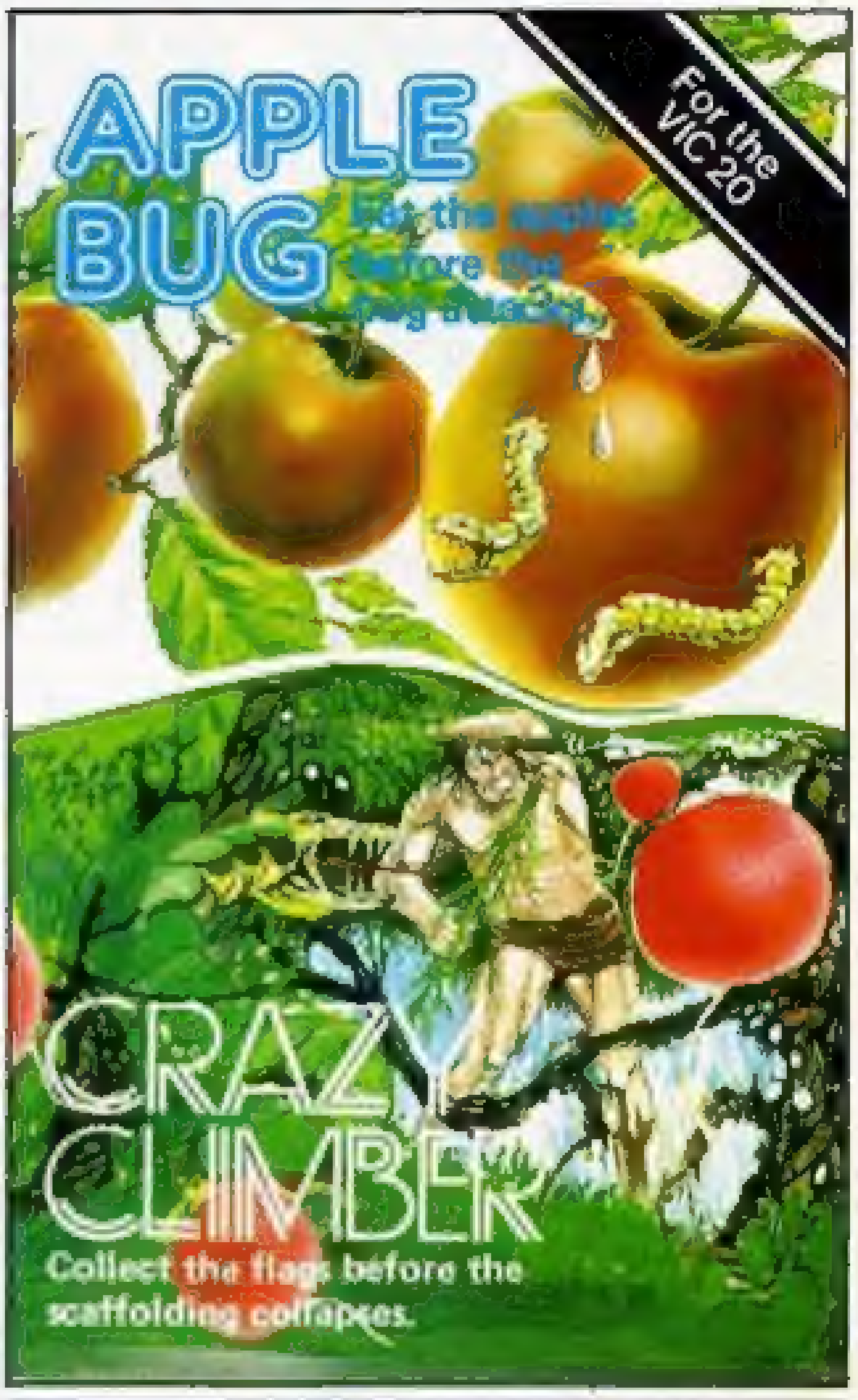
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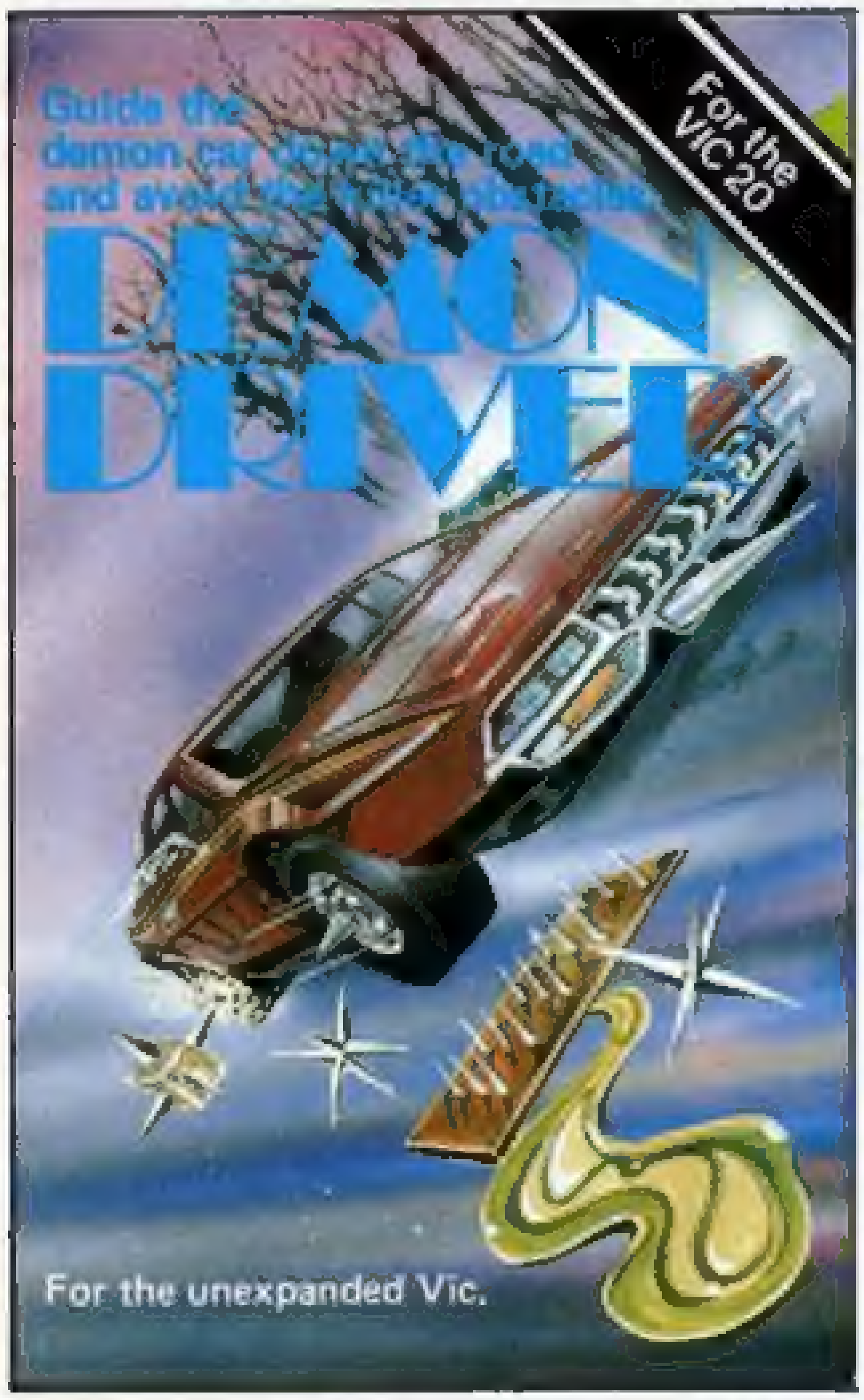
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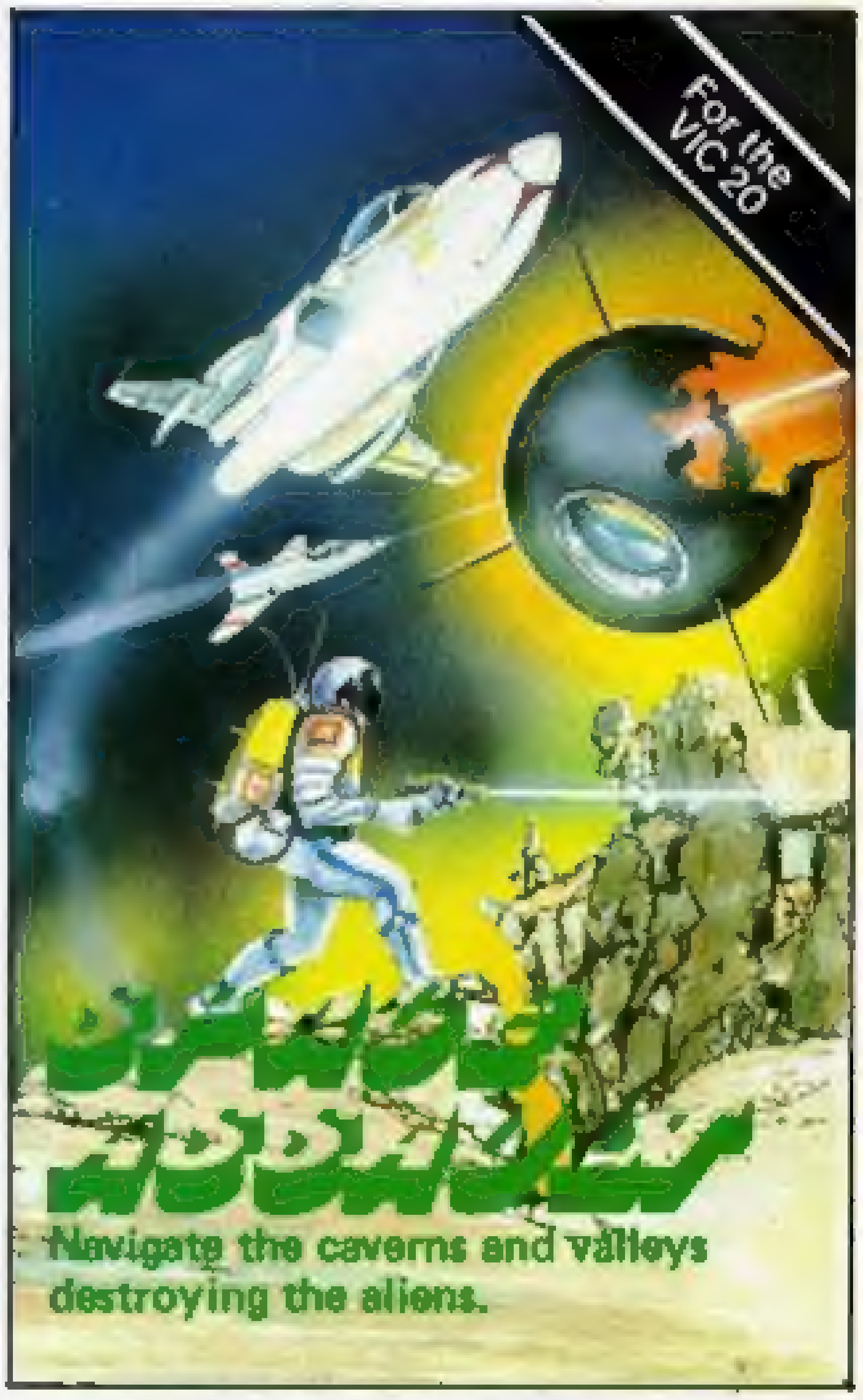
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HCW11

Dark cloud over the micro market

Everyone is talking optimistically about the growth of the micro market, but an ominous cloud hangs over the scene: the continuing bad news about delayed deliveries, faulty equipment, and inadequate after-sales service.

Complaints about mail-order sales come, with maximum publicity, from the customers. As far as shop sales are concerned, the dealers' complaints are usually more discreet; but the public can't fail to notice when machines just aren't available. In either case, the news tends to get around.

The consequences in terms of loss of public confidence are all too obvious. But it's just as important to look into the reasons behind the problem.

Most potential purchasers of home micros are total novices who wouldn't know a bit from a byte. It's reasonable to conclude, then, that price will be the main factor they will consider when deciding which machine to buy, with attractive specifications coming second in importance.

The fact that expansion to a fully comprehensive system may swamp the cost of the computer itself is disregarded at this stage, even if the possibilities for expansion are part of a particular machine's attractions. Home micro owners generally learn about the need for expansion the hard way, after a period of wrestling with cassettes and fighting for possession of the family TV.

Micro companies may feel that there is no point building some of the less obvious features — such as ability to connect up a disk drive — into their machine, because novices won't appreciate their importance anyway. But less important but more obviously attractive features, such as a small increase in the number of display characters, may be included even though they bump up the price.

Behind such dubious choices lurks the suspicion that some home micro specifications are drafted by people who don't really understand the needs of the home computer user. It is fatally easy for a company to set up a basic computer system using standard components. It is just as easy to come a cropper in developing the system to a marketable form. Research on the practical aspects of the new micro may be limited by lack of capital, or the specification may even be fixed before its practicability has been demonstrated.

The best way for companies to avoid trouble is to proceed with caution, and avoid adventurous innovation in the early stages. It may appear that a brand new process will avoid the need to pay royalties on copyright material, but the saving can cost companies dear.

In my view, the basic cause of the problems now affecting micro manufacturers is an over-confident approach coupled with limited capital resources and a limited understanding of the practicalities. Many companies venturing into the low-cost micro field are newcomers to computing — though even those with existing models are not immune to mistakes (where are those microdrives, Uncle?)

While it continues to proceed in a disorganised way, the micro industry will never realise its full potential. Poor performance in one area of the market will prejudice progress in all the others.

Don Thomasson,
Systems Engineer
Harrow

- **This space is for you to sound off about the micro scene, to present bouquets or to hurl brickbats. Share your views by sending them to Paul Liptrot, Opinion, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Please include your occupation and your interest in computing.**

Sound of the Dragon's roar

Dragons can now blow raspberries and sound like a piano, says J.C.B. (Microsystems) which has brought out a plug-in Sound Extension Module costing £34.95.

Sounds can be created either through a new BASIC command called MUSIC or by using pre-programmed effects, like explosion, gunshot, machine gun, car horn, ping and waves.

Other effects include siren, laser, falling bomb, photon torpedo, American siren, birds, cars starting, cars passing, crash, munch and raspberry.

J.C.B. says that setting up a three-note chord needs just one MUSIC command and that up to 28 separate POKEs would be required to do the same without the new module.

Sound can accompany graphics without slowing down the screen display.

The module includes two eight-bit input/output ports, accessed by the new command, which can control other devices.

J.C.B. says the manual also shows how users can program their own sound effects, useful for those with knowledge of machine code.

J.C.B. (Microsystems), 29 Southborne Road, Bournemouth BH6 5AE

Game for a bet

Five software titles for the Spectrum have been launched by Micromega at £4.95 each.

Two of them have two games on the same cassette and one also includes a version for the 16K ZX81.

The titles are Roulette, Dominoes, and Blackjack and Craps on a tape called Monte Carlo, Brainstorm, which includes Puzzler, and Spectrum and ZX81 versions of Gulpman.

Micromega, 230-236 Lavender Hill, London SW11 1LE

You could be on our pages

We welcome programs articles and tips from our readers.

PROGRAMS should, if possible, be computer printed to a width of 48 characters (use a new ribbon) and/or sent on cassette. Check carefully that they are bug-free. Include details of what your program does, how it works, variables you have used and hints on conversion.

ARTICLES on using home computers should be no longer than 2,000 words. Don't worry about your writing ability — just try to keep to the style in HCW. Articles most likely to be published will help our readers make better use of their micros by giving useful ideas, possbibly with programming examples. We will convert any sketched illustrations into finished artwork.

TIPS are short articles, and brief programming routines which we can put together with others. Your hints can aid other computer users.

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Paul Liptrot, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE

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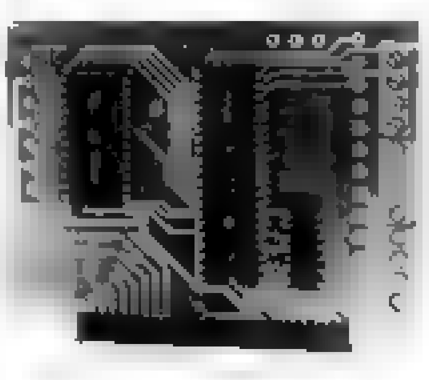

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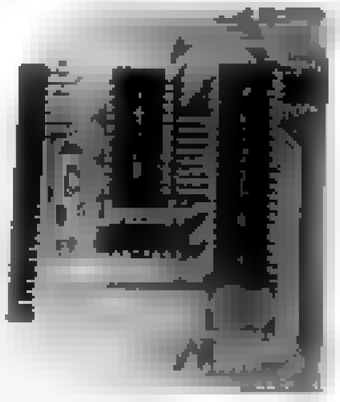

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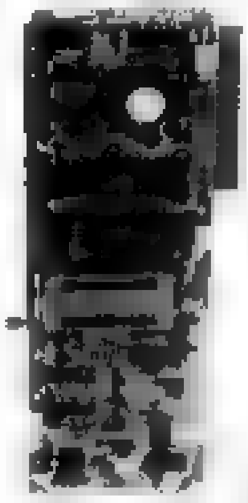

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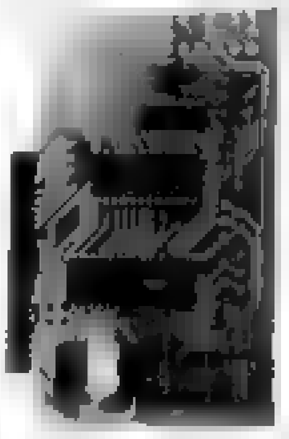

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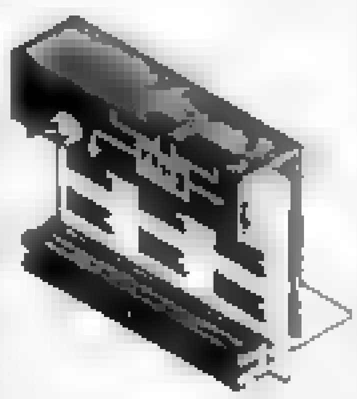

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Get ET right

Thank you for reviewing by program ET (April 26-May 2). I would just like to make a few points that the reviewer overlooked.

The instructions program is only intended to be used once to give you the idea of the game. You have the choice of seeing the instructions or loading the main program

The maze is twice the size of the screen so that when you move to the edge of the screen, the maze scrolls across the screen (I have not seen any other program use this method before).

As it being 'Well-nigh impossible to get hits in the fourth stage. I would agree with this on level 1, but the game has nine skill levels, and I very much doubt that the reviewer would be able to get through the Asteriod Belt stage at skill level 9.

The program also has the facility to save and reload the Hi-score and Hi-scorers name.

Nigel Stuart, Altrincham, Cheshire

My Lynx's colour bar problems

On the 27th of March I bought a Lynx at my local micro shop. I quickly caught the bus home and plugged it in. I fiddled about with it and tried loading in the demonstration programs, but they would not load.

When I pulled the cassette lead out of the back of the Lynx the protective black coating came off the socket, and I noticed that a wire was unsoldered So I rushed the Lynx back to the shop the same day and they fixed it for me

That night, while I was using the Lynx, I noticed thin bars of purple shooting across the screen So I took it back to the shop the next day and tried it there, but it seemed to be perfect.

I took it home and tried again I tried two black and whites, two colour TVs, but the lines were still there I returned to the shop the next day, where they swapped it for another Lynx.

On this one there were no bars, but no colour either — just black and white. So I took it back — by this time the assistants must have thought I was mad. No problems in the shop, so once again they gave me a new machine.

At home the computer was the same. No colour, just black and white. I tried this machine on several of my neighbours' TVs — a Sony, two Hitachis, and a Grundig, but still no colour.

So the next day I returned to the shop and got my money back. No I am looking for an Atari 800 — better luck next time, I hope!

Wayne Swift, Bradford

Riva Gould, of Camputers, said: "Though there were some colour problems with the very early models of the Lynx, these have now been sorted out

"I don't know what was causing Mr Swift's problems, but I wish he'd written to us — we're here to help, and all our dealers have a hotline to Camputers to deal with queries like this."

You win some . . .

I read with interest Artic Computing's letter in issue No. 8, and noted that in issue no 1, that very bug was spotted by Ray Elder in his review of Ship of Doom

Congratulations to Mr Elder and your magazine in being, as far as I know, the only ones to have noticed this. It gives me confidence in the standard of your reviewers, and I shall certainly take note of the future reviews you publish

John Ellis, Bristol

. . .you lose some

I feel I must correct the great injustice done by your reviewer R.H. to Elfin Software's brilliant Tobor program for the 48K Spectrum

It is not, as the reviewer jumps to conclude, a Pac-Man game, but a derivative of the arcade game Berserk. His comment that "you can only fire in the direction you are moving" is not a program fault at all — it is a feature of Berserk

I really do not understand the comment about unresponsive movement. Although I will admit that the playing keys are a little difficult to master. I found the program extremely responsive. Tobor remains one of the best programs in my collection.

I would like to add that I have no connection whatsoever with Elfin Software!

Raymond Blake, Rayleigh, Essex

Oric has lost its edge

Although I have no wish to start another BBC vs Spectrum war, so far all the reviews of the Oric-1 I have read have been convinced it will wipe the floor with the Spectrum. Not so. I myself have a 48K Spectrum, but recommended a friend to buy the Oric. After using it, he decided to take it back and get a Spectrum instead, although he gave it three chances (and exchanged it three times).

The Oric's operating system is better, especially the famous sound channels, but it is more difficult to program. There is no syntax checking, and the report codes are far more confusing than everyone has let on

The tape lead supplied had a three-pin DIN socket on either end instead of jack plugs. No tape recorder could be found to connect to it, so we ended up rebuilding a DIN socket with jack plugs.

The Orice has no verify command, and you have the choice of two loading speeds — amazingly slow and accurate, or amazingly fast and inaccurate. Editing is a pain. Now that Sinclair has dropped its prices, the Oric has lost the marginal (but solid) hardware lead it originally had.

A final point — the National ZX Users' Club has now been wound up, so all you ZX owners, a minute of silence; never shall they be seen again at a stand in a ZX Microfair. Everyone get out their hankies...

John Shiall, London N4

Computing by post

ZX Exchange offers opportunities to make informal postal contact with other ZX81 owners in the UK and abroad, and is especially relevant to your readers who live in rural areas, or who have no local user group

The main objective of ZX Exchange is to promote self-help and amateur program-writing.

Members of ZX Exchange receive the periodic newsletter ZX Broadsheet. For further information, contact me at the address below.

Nick Godwin, 4 Hurkur Crescent, Eyemouth, Berwicks TD14 5AP

An interesting addition

As a new 48K Spectrum owner, I've found your magazine to be most helpful and interesting.

I was particularly pleased to find a compound interest program is issue number four, and have found the following lines useful for a more serious application:

```
409 LET n=5
430 INPUT "for ten year
period starting"'
"in how m any years time",t
432 LET u=t+10
433 CLS
452 PRINT AT 2, 0, "YEAR",
AT 2, 10; "AMOUNT"
453 PRINT AT n, 1; t; AT n,
12; a
454 LET t=5+1
455 LET n=n+1
456 IF t   u THEN GOTO 440
458 IF INKEY$      "" THEN
CLS: GOTO 460
459 GOTO 458
```

Andrew Osmond, Watford, Herts

▶

Copyright confusion

After the recent arguments about the copying of cassettes I would like to comment on another aspect of the copyright law.

On all cassettes it states that you are not allowed to lend or re-sell the cassette without the publisher's permission

But while reading the classified pages of many magazines it is noticeable that the computers are nearly always sold with some software. Surely the software adds to the amount of money the seller is expecting for the transaction. This is in fact selling the program which is illegal

Since people spend up to £100 on software it seems unfair on them if they couldn't sell it in some way and without the computer this software is almost unusable to them.

But it is also unfair on the author that they do not get the chance to sell their cassettes to the buyer and they do, I would think, lose money.

The selling of software only adds to the confusion which exists in the copyright law and it's about time it's looked at again and made more clear to everybody.

G.E. Pritchard, Cardiff

Save my variables!

I wonder if any of your readers can explain to me why on such a comprehensive machine as the Lynx you cannot save variables?

I realise that you can save the programs you actually write, but this isn't a lot of use if you write a personal banking program, data base or address file where a lot of additional data needs to be saved in the form of variables

May I say I think Lynx have misrepresented their product. I think you will agree if you read their leaflet that you are led to believe you can save programs on the Lynx just as you can on say the Spectrum or Oric.

P.E. Lawrence, Orpington, Kent

Joe Lang, of Computers, said. "The following short routine can be added to any Lynx program as a CODE line and will save variables, PROTECT levels and INK and PAPER colours:

```
1000 CODE EB 21 F6 61 E5 2A
1F 62 E5 21 00 0 C3 FF 3E
1010 REM "program name"
1020 CALL LCTN (1000),
LCTN (1010)
1030 REM "program will run
from here"
```

"Save your program by using RUN 1020. The program is contained in line 1010. To load the program, use MLOAD "program name". The program will automatically run from the line following that containing the CALL LCTN.

"This program will appear in the next edition of the Lynx owners newsletter, which is available free to everyone who sends in their guarantee cards."

Fighting talk

To all those who have had problems with computer companies who don't deliver on time, here's my advice.

Persevere. Ring and ring until they get sick of the sound of your voice. If they offer or send your money back, tell them they are breaking the contract (because that's what it is). Say that if they don't pull their socks up you will issue writs against them.

It works — I've tried it. I was order number 5 with Oric International, and I waited almost five months for mine. But after sending them the draft of a letter "expressing my views", which was to go to a computer magazine, they got worried and after 2 days, there was my Oric.

My last word is don't give in, and if need be, stop all payments (if you use a credit card) until you get it. Good luck with the arguing...

R. Whitfield, Chelmsford, Essex

Out with the old in with the new

Thank you for including my cassette Venture in your last lot of cassette reviews, but unfortunately it would appear that your reviewer relied on past knowledge of a much older version of this cassette.

For well over three months Venture cassette has replaced the Bomber game with a 'Blitz' type game. Also, the 16K & 48K versions has been replaced with a dual load version for 16K or 48K AND an additional three compulsive games are included at no extra cost.

This cassette is as advertised in my full page advert in the first issue of Home Computing Weekly and is sold as a 'value for money' cassette.

This new Venture cassette is available from several computer shops in north of England and sells reasonably well with a fair percentage being sold on 'recommendation' of friends. One major difference with Venture is that the pictures on the front of the cassette sleeve is honest in that it shows actual games.

This is unlike the majority of cassettes which are blatantly breaking the Trade Descriptions Act by showing pictures which bear no relation to the actual content. I for one am not prepared to splash pictures of space men & rocket ships on a sleeve unless game actually contains the graphic thus shown.

G.A. Bobker, G&J Bobker, Bury, Lancs

Our apologies to Mr Bobker, but our reviewer is innocent — he reviewed exactly what he was sent. Clearly one of the old versions of Venture must have turned up in the office somewhere. Still, nothing Ventured, nothing gained..

A question of character

In your magazine of 12-18 April you included a character redefiner by Marc Freebury. I was most intrigued by this program and loaded it into my Atari 800

It worked OK, except for the inversion part which only printed blanks. However, I traced the problem to lines 3030 and 3070 If the GOSUB 6200 is changed over, it works perfectly.

I hope this will be useful to others like myself. I only started this hobby in February this year, and find it very satisfying Incidentally, I am over 60.

H.G. Woodman, Wembley, Middlesex

Fast work by TI

In these days of long delays and bad service by some companies to their customers, I would like it to be known that there is one company at least who look after their customers — namely Texas Instruments.

Last week I phoned TI to ask about loss of colour on my TI99/4A. Their technician diagnosed this fault as a faulty modulator, and within four days a new modulator had arrived by Securicor Parcel Service.

What about that for service, par excellence.

W.D. Roberts, Colwyn Bay, Clwyd

TI progam power

I just wrote to say congratulations for an excellent magazine Having bought all six issues so far, I've found that Home Computing Weekly is worth every penny

I myself own a TI-99/4A, and the series of graphics progamming routines for this computer has given me a lot of help in my own games programming. Many thanks to David Gray who wrote the series.

Please keep up the good work — and more competitions and game revies please!

Simon Dawson, Workington, Cumbria

Alteration altercation

I read with interest Mr Casson's "alterations" to my character generating program (Letters, issue 8). While line 2005 is indeed a print error, I think he will find that line 1030 renders his other corrections both unnecessary and inefficient.

Mr Casson has also overlooked the fact that the program is for designing charactes, not changing them. The reason for this becomes all tool obvious when you change characters in use on the screen, in particular '   ', which produces amusing but illegible displays.

Grant Privett, Waltham Cross, Herts ■

A NEW SERIES FOR FIRST TIME USERS

Kevin Townsend
LEARNING TO USE THE TI99/4A COMPUTER
Robin Bradbeer
LEARNING TO USE THE ZX81
Garry Marshall
LEARNING TO USE THE PET COMPUTER
William Turner
LEARNING TO USE THE APPLE II/IIe
Robin Bradbeer
LEARNING TO USE THE ZX SPECTRUM
Ron Geere
LEARNING TO USE THE VIC-20 COMPUTER
Robin Bradbeer
LEARNING TO USE THE DRAGON 32 COMPUTER
P N Dane
LEARNING TO USE THE BBC MICRO COMPUTER

"Learning to Use" is a new series of books which introduces newcomers to the most widely used micros in the marketplace.

The books assume absolutely no knowledge about computers and the reader is shown even the most fundamental operations such as "switching on" and "loading a program". The books lead the reader through simple programming and then on to graphics, with several programs which show how to achieve pictures and even animation!

The user-friendly approach is consistent throughout the text – not only are program listings clearly shown, but in many cases, a photograph is included to show what the program looks like when actually loaded and run!

All books in the series are £5.95 (incl. postage).

Gower

To be published April–June 1983

Learning to Use the Oric 1 Computer (April)
Learning to Use the Commodore 64 Computer (May)
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Escape from Orion BBC 32K £6.95

[illegible], Hope Cottage, Winterbourne, Newbury, Berks

This [illegible] game [illegible] four entertaining screens with good graphics. The astronaut [illegible] spaceport for his ship [illegible] his way up ladders and over gaps to [illegible].

The [illegible] you [illegible] which hazards to face out of fast missiles, lifts, conveyor belts and electric doors. You can also select which level to start at. It is the first program I have seen to change the colours for those with black and white sets.

The difficulty levels are very gradual; [illegible] beyond level 3 calls for real skill. The control keys are well placed and the joystick option offers a good responsive game [illegible] joystick software.

The only real faults are the instructions, which devote a great deal of print and screen to the slightly strange choice of colours. Nevertheless the addictive value is high.

[illegible] have [illegible] here.

D.C.

instructions	50%
playability	[illegible]
graphics	[illegible]
value for money	[illegible]

★ ★ ★ ★

Skyhawk VIC-20 £7.95

Quicksilva, 13 Palmerston Rd,
Southampton SO1 1LL

Skyhawk is a defender-type game in which you pilot a plane and try to protect a town from enemy fighter bombers. Your plane can travel both left and right at one of three speeds, and takes off vertically.

The action takes place over a nicely-drawn town which scrolls smoothly in both directions depending on your direction of flight. The enemy aircraft attack in waves of increasing numbers from either direction, and you can see actual deployment and number of enemy on a small radar screen.

The fuel and missile supplies of your plane are limited — you must replenish them by landing on one of the available landing stages. But the enemy will try to destroy the landing points before you can get there! The aim of the game is to simply survive and destroy as many of the aliens as possible.

Overall a well-made program which uses multicolour mode and 3D effects. Animation is smooth and effective

But control of the plane is by joystick only — a bit silly, since many VIC owners do not own joysticks

I feel too, that the concept lacked originality. Bearing in mind the effort being made by Quicksilva to extend its cut of the market, I would like to see some brighter ideas than this.

In spite of my reservations, though, this is an addictive and difficult game which represents good value.

A.W.

instructions	50%
playability	70%
graphics	80%
value for money	80%

★ ★ ★ ★

Damper/Glooper 16K ZX81 £4.95

Quicksilva, 13 Palmerston Road,
Southampton, SO1 1LL

I didn't find the blurb for this program very helpful in understanding the game, in spite of the writer's vivid imagination; but the game itself was better.

Damper puts you in a city on an alien planet; mysterious black blobs are attaching themselves to the power cables, moving around the grid and sapping the city's power supply. Your job is to move a grid runner around the wires, damping down the power while avoiding the aliens.

The game loaded and ran with no problems; there are optional instructions displayed at the start of the programme

There are five 'dampers' for you to avoid; they move in an irregular wave up and down the grid, and if your timing is not precise it is very easy to get caught!

The graphics are clear and the controls are quick without being over-sensitive. You have three 'lives' (plus bonus if you become good at the game) and the speed increases as the game progresses.

Scores are displayed, and at the end of each game there is a 'hall of fame' display; the players with the highest scores may enter their names. There is also a facility for saving the game.

I found Dampers a straightforward game, without frills, but with enough difficulty involved to prevent the player from becoming bored — everytime I thought I had the knack of avoiding the 'dampers' I managed to get caught

Glooper is a relative of Quicksilva's Munchees, fun to play and competently produced.

C.C-R

instructions	60%
playability	80%
graphics	70%
value for money	85%

★ ★ ★ ★

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DAMPER/GLOOPER
ZX-81 GAMES FROM
QUICKSILVA
FOR THE ZX81 WITH 16K RAM

Bank on your micro to check on your cheques

How much is in your bank account? Don't wait for a statement, Anthony Gray's program for the TI-99/4A will tell you straight away, and help your budgetting

Keep an eye on your spending with my bank account program for the TI-99/4A. It allows the initial balance and a series of transactions to be maintained and manipulated.

Each entry consists of an amount, a date, a cheque number and some details.

The amount is entered as the number of pence — a negative number is a debit and a positive number represents a credit. Dates are entered in the form dd/mm/yy and are checked for validity.

The cheque numbers and details are arbitrary strings of up to 15 and 56 characters respectively: extra characters are discarded. This means two transactions can always fit into a record on a cassette tape

When the program is run you are asked for the data and the following menu of options is displayed, chosen by pressing the appropriate letter:

N	set New date and/or new initial balance
B	determine the new Balance after transactions
I	Input details of an account from a cassette file
O	Output. Save details of the account on a cassette file
A	Add a new entry to the account
C	Change an existing entry
R	Remove an entry from the account
S	Sort all the entries according to their dates
T	Terminate. Quit the program

You should only need to follow the instructions on the screen, but bear in mind the following points:

An entry is specified by its item number (1, 2, 3...)

When you want to change an entry, that entry will be displayed along with another menu. Press the appropriate letter for the option you require

When asked a question with a yes or no answer press Y or y for yes and N or n for no

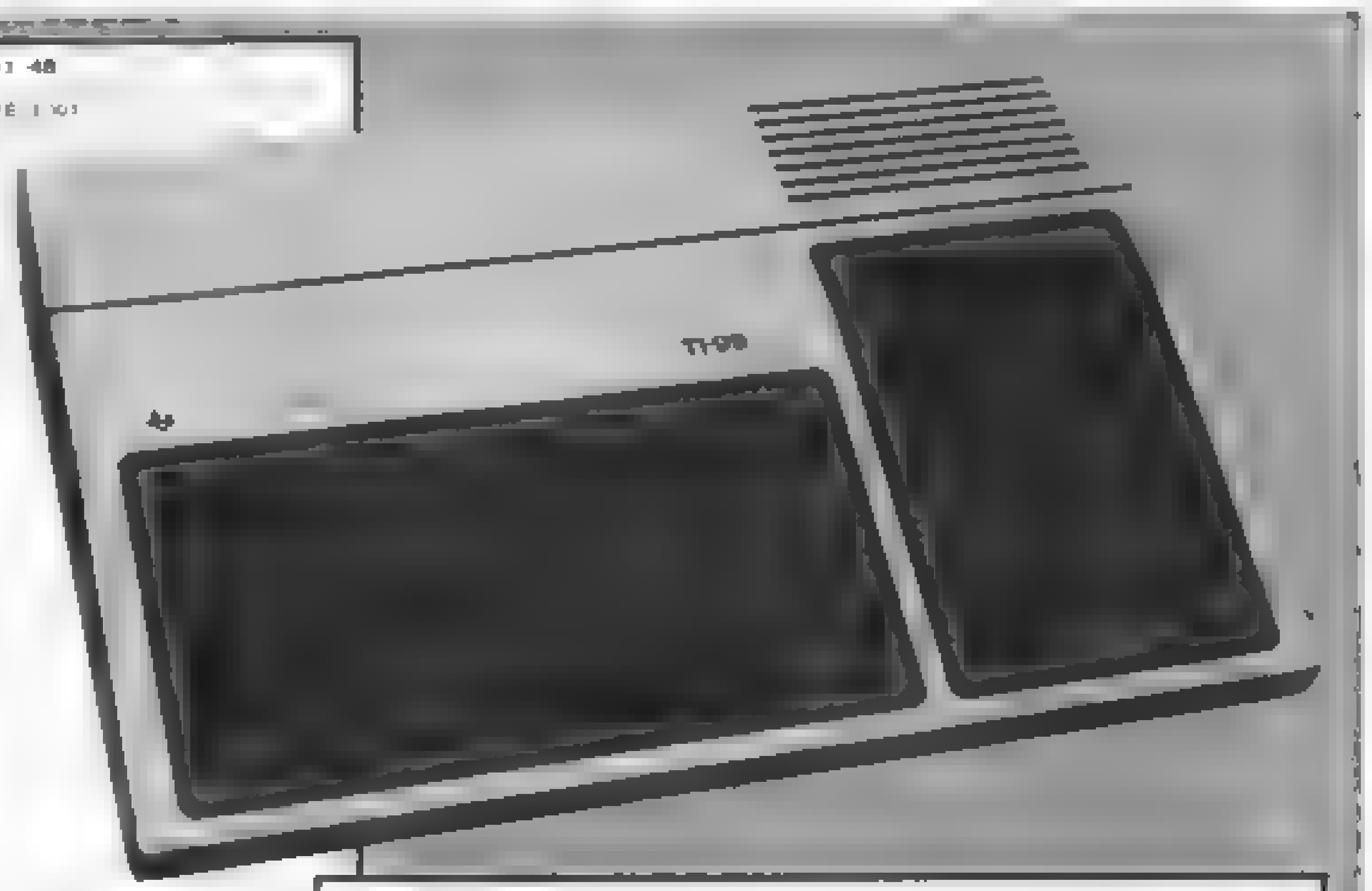
The program has been designed to be as robust as possible, however, there are certain errors with tapes which cannot be detected and prevented, so take care.

No attempt is made to ensure that only integer values are input as amounts or that values do not become too large. Numeric errors of this kind do not cause the program to fail, but will give wrong results.

How it works

100	function to convert two-character string into a number
110	maximum number of entries possible
120	arrays to hold details amounts cheque numbers and dates of entries
130	definition of £ character
140-160	set initial values for the number of entries (COUNT) today's date and balance
170	get today's date
180	display menu
190-320	await input and act accordingly. Accept either upper or lower case and make noise on invalid selection
330-370	deal with Terminate option, but first ensure user wants to quit
380-440	sub routine to display menu
610-720	deal with New Initialise option Ask for today's date and then, if current initial balance is incorrect, get a new one
730-860	deal with Balance option Work out new balance by adding AMOUNTs to existing balance
870-1140	Input file option First ensure user does want to read a file then ensure title of file indicates correct data Read data from tape and display cheque number of each entry read
1150-1390	Output file option First ask user for a title for the file being written and then ensure all is well before writing the tape As each item is written to the tape, display its cheque number
1400-1710	Add entry option After checking there is room, input data for the new entry Display new entry and ask for confirmation that it is to be inserted Repeat if user wants to add more
1720-1860	Display entries option Display each entry or message to show there are none Waits for user to press space bar after each pair of entries has been displayed
1870-1960	Sub-routine to turn a number (VALUE) representing a number of pence in to a string (VALUE$) in sterling notation For example, 5673 is turned into £56 73 and -5673 is turned into £56 73 db
1970-2070	sub-routine to accept Y, y N or n as answers and return true or false on yes
2080-2370	request date as dd mm/yy, check validity and place date into THE DATE in the form yymmdd to ensure that entries can be sorted into chronological order
2380-2430	sub routine to convert date back into dd mm yy and place in DATE$
2440-2490	press space bar to continue
2500-2700	display entry with item number given by INDEX
2610-2950	Change entry option Ask for item number of entry to be changed and check it exists Then display entry and menu of options Wait for selection and perform required change By selecting Next, user can change another entry and by choosing Exit will return to main menu
2960-3190	Remove entry Ask for item number to be removed, ensure it exists, display entry, ask for confirmation that it has to be removed Move all subsequent entries down one place Check if user wants to remove more, return to main menu
3200-3400	Sort entries into chronological order

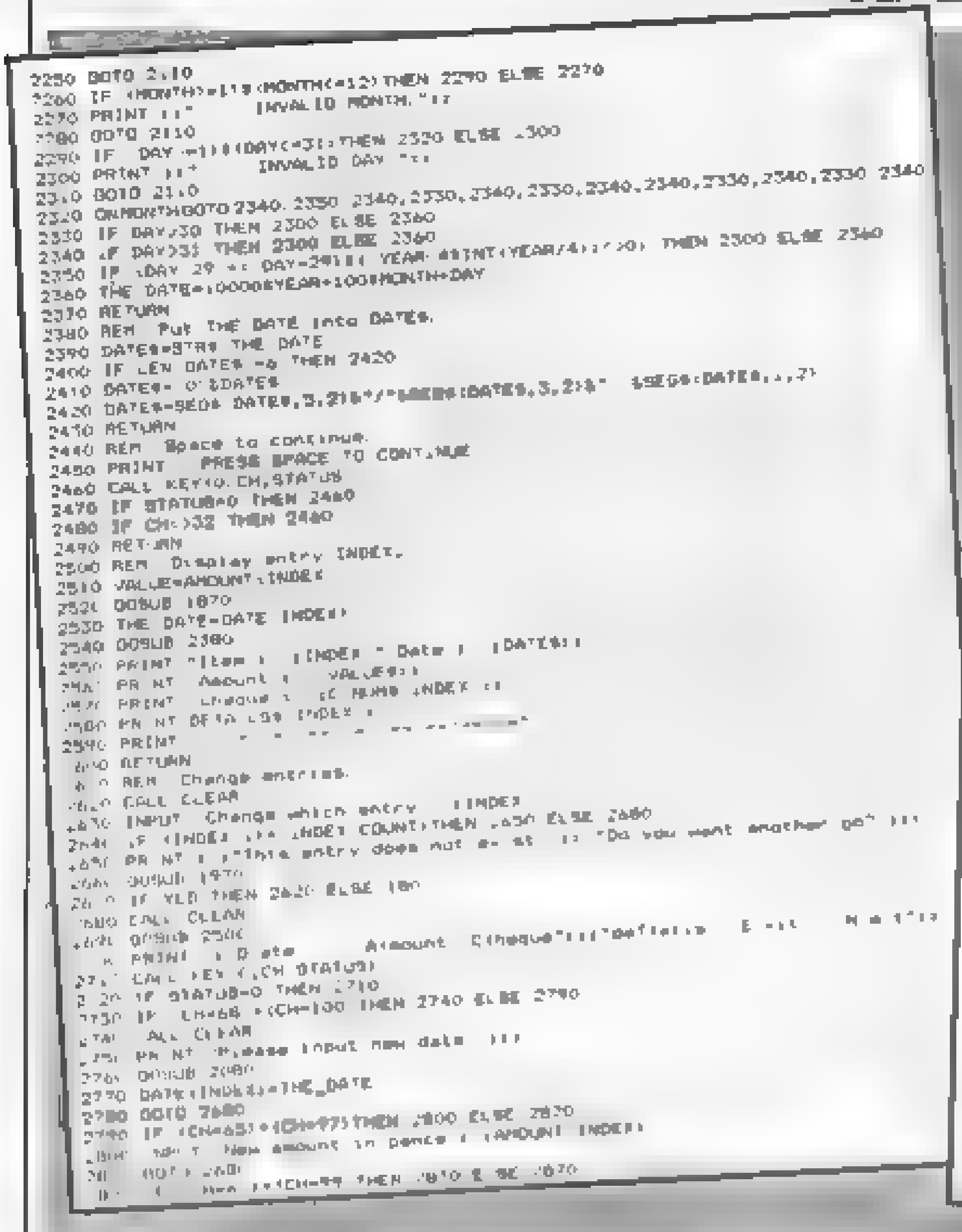
▶



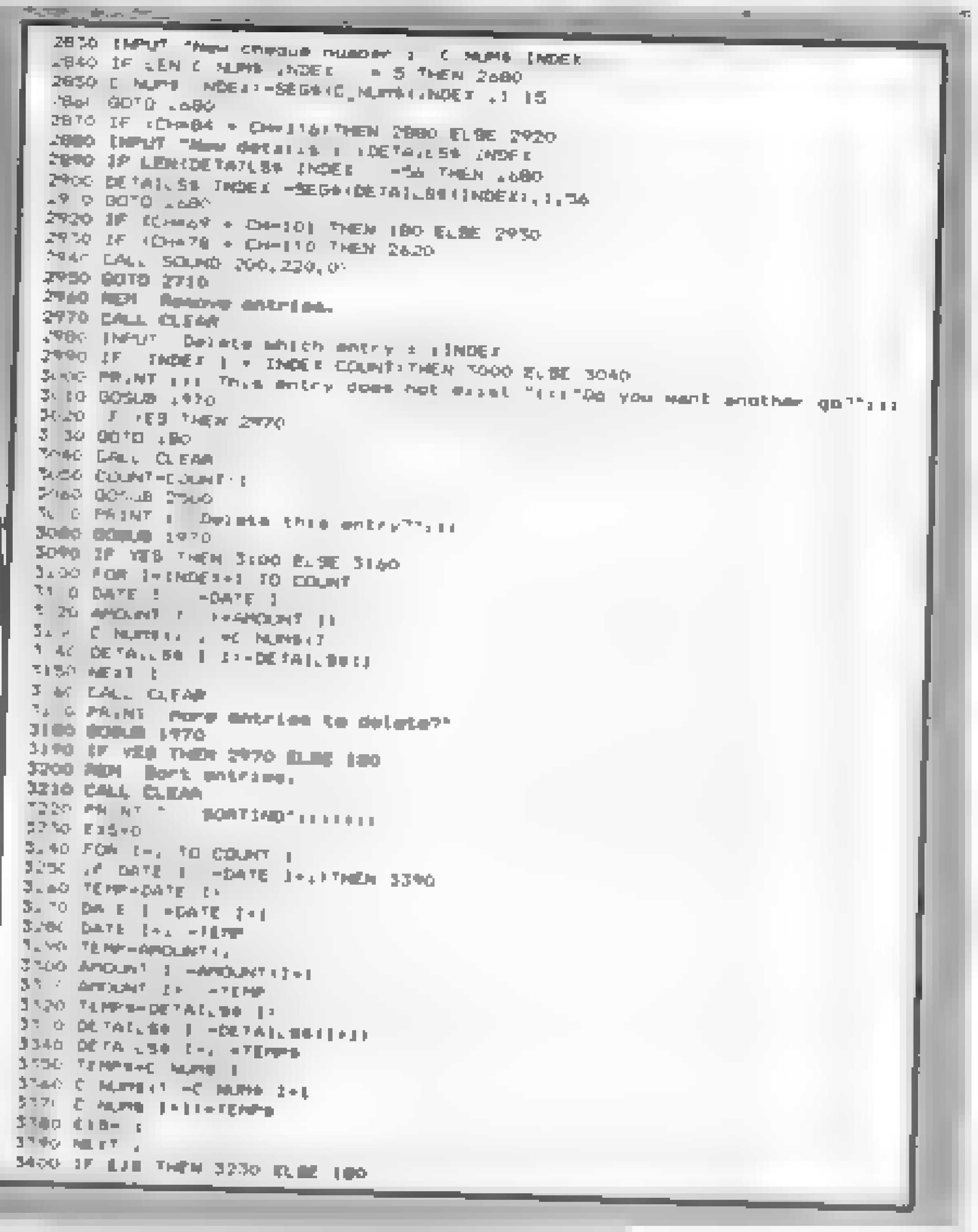
```
100 DEF CONV(B$)=10*(ASC(B$)-48)+ASC(SEG$(B$,2,1))-48
110 DEF MAX=90
120 DIM DETAILS$(100),AMOUNT(100),C NUM$(100),DATE(100)
130 CALL CHAR(128,"6127E1C7C303C73")
140 COUNT=0
150 TODAY=830101
160 BALANCE=0
170 GOSUB 380
180 GOSUB 450
190 CALL KEY(0,CH,STATUS)
200 IF STATUS=0 THEN 190
210 IF (CH=78)+(CH=110)THEN 610
220 IF (CH=66)+(CH=98)THEN 730
230 IF (CH=73)+(CH=105)THEN 870
240 IF (CH=79)+(CH=111)THEN 1150
250 IF (CH=65)+(CH=97)THEN 1400
260 IF (CH=67)+(CH=99)THEN 2610
270 IF (CH=82)+(CH=114)THEN 2960
280 IF (CH=68)+(CH=100)THEN 1720
290 IF (CH=83)+(CH=115)THEN 3100
300 IF (CH=84)+(CH=116)THEN 330
310 CALL SOUND(200,220,0)
320 GOTO 190
330 CALL CLEAR
340 PRINT "Are you sure you want to":::"quit ?"
350 GOSUB 1970
360 IF YES THEN 370 ELSE 180
370 STOP
380 REM Get to-day's date
390 CALL CLEAR
400 PRINT "      BANK BALANCE PROGRAM":::
410 PRINT "Please input to-day's date"::
420 GOSUB 2080
430 TODAY=THE DATE
440 RETURN
450 REM Display menu
460 CALL CLEAR
470 THE DATE=TODAY
480 GOSUB 2380
490 PRINT "Date is ";DATE$:
500 PRINT TAB(8);"N ew  Initialise"::
510 PRINT TAB(8);"B alance"::
520 PRINT TAB(8);"I nput file"::
530 PRINT TAB(8);"O utput file"::
540 PRINT TAB(8);"A dd entry"::
550 PRINT TAB(8);"C hange entry"::
560 PRINT TAB(8);"R emove entry"::
570 PRINT TAB(8);"D isplay entries"::
580 PRINT TAB(8);"S ort entries"::
590 PRINT TAB(8);"T erminate"
600 RETURN
610 REM   Get new date and balance.
620 GOSUB 380
630 CALL CLEAR
640 VALUE=BALANCE
650 GOSUB 1870
660 PRINT "Is the initial balance :":::TAB(8);VALUE$;" ?"
670 GOSUB 1970
680 CALL CLEAR
690 IF YES THEN 180
700 PRINT "What is the initial balance":"in pence.":::
710 INPUT BALANCE
720 GOTO 180
730 REM Work out new balance.
740 CALL CLEAR
750 TEMP=BALANCE
760 FOR I=1 TO COUNT
770 TEMP=TEMP+AMOUNT(I)
780 NEXT I
790 VALUE=BALANCE
800 GOSUB 1870
810 PRINT "Old balance :":::"  ";VALUE$:::
820 VALUE=TEMP
830 GOSUB 1870
840 PRINT "New balance :-":::"  ";VALUE$:::"after ";COUNT;"transactions":::
850 GOSUB 2440
860 GOTO 180
870 REM Input details from tape.
880 CALL CLEAR
890 PRINT "Are you sure you want to":::"read a tape?"
900 GOSUB 1970
910 IF YES THEN 920 ELSE 180
920 CALL CLEAR
930 OPEN #1:"CS1",INTERNAL,INPUT ,FIXED 192
940 INPUT #1:THE DATE,TITLE$,
950 CALL CLEAR
960 GOSUB 2380
970 PRINT "TAPE IS :-"::
980 PRINT "  ";TITLE$
990 PRINT ::"written on ";DATE$;"."::
1000 PRINT "Do you want to read it?"
1010 GOSUB 1970
1020 IF YES THEN 1030 ELSE 1120
1030 CALL CLEAR
1040 INPUT #1:COUNT,BALANCE
1050 FOR INDEX=1 TO COUNT
1060 IF INDEX-2*INT(INDEX/2)=0 THEN 1090
1070 INPUT #1:DETAILS$(INDEX),AMOUNT(INDEX),C NUM$(INDEX),DATE(INDEX),
1080 GOTO 1100
1090 INPUT #1:DETAILS$(INDEX),AMOUNT(INDEX),C NUM$(INDEX),DATE(INDEX)
1100 PRINT INDEX;"     ";C NUM$(INDEX)::
1110 NEXT INDEX
1120 CLOSE #1
1130 CALL CLEAR
1140 GOTO 180
1150 REM Save details on tape.
1160 CALL CLEAR
1170 PRINT "Title for tape please.":::
1180 INPUT TITLE$
1190 IF LEN(TITLE$)<100 THEN 1210
1200 TITLE$=SEG$(TITLE$,1,99)
1210 CALL CLEAR
1220 PRINT "Are you sure you want to":"rewrite the tape : ";TITLE$
1230 GOSUB 1970
1240 IF YES THEN 1250 ELSE 180
1250 CALL CLEAR
1260 PRINT "Writing : ":::TITLE$
1270 OPEN #1:"CS1",INTERNAL,OUTPUT,FIXED 192
1280 PRINT #1:TODAY,TITLE$,
1290 PRINT #1:COUNT,BALANCE
1300 FOR INDEX=1 TO COUNT
1310 PRINT INDEX;"     ";C NUM$(INDEX)::
1320 IF INDEX-2*INT(INDEX/2)=0 THEN 1350
1330 PRINT #1:DETAILS$(INDEX),AMOUNT(INDEX),C NUM$(INDEX),DATE(INDEX),
1340 GOTO 1360
1350 PRINT #1:DETAILS$(INDEX),AMOUNT(INDEX),C NUM$(INDEX),DATE(INDEX)
1360 NEXT INDEX
1370 CLOSE #1
1380 CALL CLEAR
```

```
1390 GOTO 180
1400 REM Add a new entry
1410 CALL CLEAR
1420 IF COUNT<MAX THEN 1460
1430 PRINT "No room for more entries":::
1440 GOSUB 2440
1450 GOTO 180
1460 INDEX=COUNT+1
1470 PRINT "Input date for the entry"::
1480 GOSUB 2080
1490 DATE(COUNT+1)=THE DATE
1500 PRINT ::
1510 INPUT "Amount in pence : ":AMOUNT(COUNT+1)
1520 PRINT :
1530 INPUT "Cheque number : ":C NUM$(COUNT+1)
1540 IF LEN(C NUM$(COUNT+1))>15 THEN 1550 ELSE 1560
1550 C NUM$(COUNT+1)=SEG$(C NUM$(COUNT+1),1,15)
1560 PRINT ::
1570 INPUT "Details           : ":DETAILS$(COUNT+1)
1580 IF LEN(DETAILS$(COUNT+1))>56 THEN 1590 ELSE 1600
1590 DETAILS$(COUNT+1)=SEG$(DETAILS$(COUNT+1),1,56)
1600 CALL CLEAR
1610 INDEX=COUNT+1
1620 GOSUB 2500
1630 PRINT "Do you want this inserted"::
1640 GOSUB 1970
1650 IF YES THEN 1670
1660 COUNT=COUNT+1
1670 CALL CLEAR
1680 PRINT "Do you want to add another":"entry ?"
1690 GOSUB 1970
1700 IF YES THEN 1400
1710 GOTO 180
1720 REM Display entries
1730 CALL CLEAR
1740 IF COUNT>0 THEN 1780
1750 PRINT "     There are no entries.":::
1760 GOSUB 2440
1770 GOTO 180
1780 FOR INDEX=1 TO COUNT
1790 GOSUB 2500
1800 IF (INDEX-2*INT(INDEX/2))<>0 THEN 1830
1810 GOSUB 2440
1820 CALL CLEAR
1830 NEXT INDEX
1840 PRINT "          FINISHED    ":::
1850 GOSUB 2440
1860 GOTO 180
1870 REM  Truns VALUE into a suitable string VALUE$
1880 NEG=VALUE<0
1890 VALUE=ABS(VALUE)
1900 VALUE$=STR$(VALUE)
1910 IF LEN(VALUE$)>2 THEN 1930
1920 VALUE$=SEG$("00",1,3-LEN(VALUE$))&VALUE$
1930 VALUE$=CHR$(128)&" "&SEG$(VALUE$,1,LEN(VALUE$)-2)&
"."&SEG$(VALUE$,LEN(VALUE$)-1,2)
1940 IF NEG THEN 1950 ELSE 1960
1950 VALUE$=VALUE$&" db"
1960 RETURN
1970 REM Get answer Y or N.
1980 CALL KEY(0,CH,STATUS)
1990 IF STATUS=0 THEN 1980
2000 IF (CH=89)+(CH=121)THEN 2010 ELSE 2030
2010 YES=1
2020 RETURN
2030 IF (CH=78)+(CH=110)THEN 2040 ELSE 2060
2040 YES=0
2050 RETURN
2060 CALL SOUND(200,220,0)
2070 GOTO 1980
2080 REM Get a date.
2090 THE DATE=TODAY
2100 GOSUB 2380
2110 PRINT "  Enter date as dd/mm/yy ":"   ENTER gives ";DATE$::
2120 INPUT D$
2130 IF D$="" THEN 2140 ELSE 2150
2140 RETURN
2150 X=POS(D$,"/",1)
2160 Y=POS(D$,"/",X+1)
2170 IF (X=3)*(Y=6)*(LEN(D$)=8)THEN 2200
2180 PRINT ::"       INVALID FORMAT  "::
2190 GOTO 2110
2200 MONTH=CONV(SEG$(D$,4,2))
2210 YEAR=CONV(SEG$(D$,7,2))
2220 DAY=CONV(SEG$(D$,1,2))
2230 IF (YEAR>=83)*(YEAR<=99)THEN 2260 ELSE 2240
2240 PRINT ::"       INVALID YEAR  "::
```

TI-99/4A PROGRAM



```
2250 GOTO 2110
2260 IF (MONTH>=1)*(MONTH<=12)THEN 2290 ELSE 2270
2270 PRINT ::"      INVALID MONTH.":
2280 GOTO 2110
2290 IF (DAY>=1)*(DAY<=31)THEN 2320 ELSE 2300
2300 PRINT ::"      INVALID DAY ":
2310 GOTO 2110
2320 ON MONTH GOTO 2340,2350,2340,2330,2340,2330,2340,2340,2330,2340,2330,2340
2330 IF DAY>30 THEN 2300 ELSE 2360
2340 IF DAY>31 THEN 2300 ELSE 2360
2350 IF (DAY>29)+(DAY=29)*(YEAR-4*INT(YEAR/4)<>0) THEN 2300 ELSE 2360
2360 THE_DATE=10000*YEAR+100*MONTH+DAY
2370 RETURN
2380 REM  Put THE_DATE into DATE$.
2390 DATE$=STR$(THE_DATE)
2400 IF LEN(DATE$)=6 THEN 2420
2410 DATE$="0"&DATE$
2420 DATE$=SEG$(DATE$,5,2)&"/"&SEG$(DATE$,3,2)&"/"&SEG$(DATE$,1,2)
2430 RETURN
2440 REM  Space to continue.
2450 PRINT "  PRESS SPACE TO CONTINUE"
2460 CALL KEY(0,CH,STATUS)
2470 IF STATUS=0 THEN 2460
2480 IF CH<>32 THEN 2460
2490 RETURN
2500 REM  Display entry INDEX.
2510 VALUE=AMOUNT(INDEX)
2520 GOSUB 1870
2530 THE_DATE=DATE(INDEX)
2540 GOSUB 2380
2550 PRINT "Item : ";INDEX;" Date : ";DATE$::
2560 PRINT "Amount : ";VALUE$::
2570 PRINT "Cheque : ";C_NUM$(INDEX)::
2580 PRINT DETAILS$(INDEX):
2590 PRINT "   -  -  --  -  --  --  ------"
2600 RETURN
2610 REM  Change entries.
2620 CALL CLEAR
2630 INPUT "Change which entry : ":INDEX
2640 IF (INDEX<1)+(INDEX>COUNT)THEN 2650 ELSE 2680
2650 PRINT ::"This entry does not exist"::"Do you want another go?":::
2660 GOSUB 1970
2670 IF YES THEN 2620 ELSE 180
2680 CALL CLEAR
2690 GOSUB 2500
2700 PRINT ": D ate       Amount  Cheque":::"Details   E xit    N e t"::
2710 CALL KEY(0,CH,STATUS)
2720 IF STATUS=0 THEN 2710
2730 IF (CH=68)+(CH=100) THEN 2740 ELSE 2790
2740 CALL CLEAR
2750 PRINT "Please input new date ":::
2760 GOSUB 2080
2770 DATE(INDEX)=THE_DATE
2780 GOTO 2680
2790 IF (CH=65)+(CH=97)THEN 2800 ELSE 2820
2800 INPUT "New amount in pence : ":AMOUNT(INDEX)
2810 GOTO 2680
2820 [illegible]+(CH=99 THEN 2830 ELSE 2870
```



```
2830 INPUT "New cheque number : ":C_NUM$(INDEX)
2840 IF LEN(C_NUM$(INDEX))<=5 THEN 2680
2850 C_NUM$(INDEX)=SEG$(C_NUM$(INDEX),1,5)
2860 GOTO 2680
2870 IF (CH=84)+(CH=116)THEN 2880 ELSE 2920
2880 INPUT "New details : ":DETAILS$(INDEX)
2890 IF LEN(DETAILS$(INDEX))<=36 THEN 2680
2900 DETAILS$(INDEX)=SEG$(DETAILS$(INDEX),1,36)
2910 GOTO 2680
2920 IF (CH=69)+(CH=101) THEN 180 ELSE 2930
2930 IF (CH=78)+(CH=110) THEN 2620
2940 CALL SOUND(200,220,0)
2950 GOTO 2710
2960 REM  Remove entries.
2970 CALL CLEAR
2980 INPUT "Delete which entry : ":INDEX
2990 IF (INDEX<1)+(INDEX>COUNT)THEN 3000 ELSE 3040
3000 PRINT ::"This entry does not exist"::"Do you want another go?":::
3010 GOSUB 1970
3020 IF YES THEN 2970
3030 GOTO 180
3040 CALL CLEAR
3050 COUNT=COUNT-1
3060 GOSUB 2500
3070 PRINT :"Delete this entry?"::
3080 GOSUB 1970
3090 IF YES THEN 3100 ELSE 3160
3100 FOR I=INDEX+1 TO COUNT
3110 DATE(I-1)=DATE(I)
3120 AMOUNT(I-1)=AMOUNT(I)
3130 C_NUM$(I-1)=C_NUM$(I)
3140 DETAILS$(I-1)=DETAILS$(I)
3150 NEXT I
3160 CALL CLEAR
3170 PRINT "More entries to delete?"
3180 GOSUB 1970
3190 IF YES THEN 2970 ELSE 180
3200 REM  Sort entries.
3210 CALL CLEAR
3220 PRINT "     SORTING"::::::::
3230 E15=0
3240 FOR I=1 TO COUNT-1
3250 IF DATE(I)<=DATE(I+1)THEN 3390
3260 TEMP=DATE(I)
3270 DATE(I)=DATE(I+1)
3280 DATE(I+1)=TEMP
3290 TEMP=AMOUNT(I)
3300 AMOUNT(I)=AMOUNT(I+1)
3310 AMOUNT(I+1)=TEMP
3320 TEMP$=DETAILS$(I)
3330 DETAILS$(I)=DETAILS$(I+1)
3340 DETAILS$(I+1)=TEMP$
3350 TEMP$=C_NUM$(I)
3360 C_NUM$(I)=C_NUM$(I+1)
3370 C_NUM$(I+1)=TEMP$
3380 E15=1
3390 NEXT I
3400 IF E15 THEN 3230 ELSE 180
```

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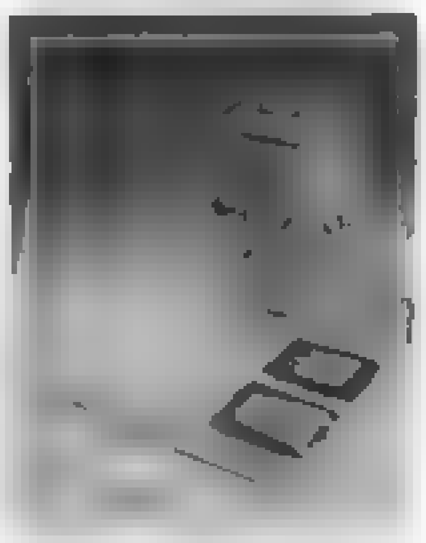

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They laughed when he set up the company . . .

Psion software has featured prominently in the Top 20 charts of best selling programs for the Spectrum and ZX81, and its name has been linked with Sinclair Research. Candice Goodwin talked to managing director Dr David Potter and learned the secrets of Psion's success

The funny thing about home micro software companies is that, despite the high-technology nature of their business, their offices are usually very low-technology indeed. Psion is an exception in actually looking like a computing company — complete with rows of programmers gazing intently at rows of screens.

For, unlike most companies in home software which employ freelance programmers working at home, all 16 of Psion's programmers work at its headquarters at 2 Huntsworth Mews, near London's Regent Park.

Dr David Potter, Psion's managing director, sees this as a vital part of creating a committed team. He said "So far, nobody has ever left Psion. It's not the money — though we pay very well according to company industry standards — but a commitment that comes from everybody being involved.

"The atmosphere's terrific. Everybody's learning, and they know they're helping to produce the best."

David Potter is clearly proud of the organisation he has set up. "I think we have development facilities second to none, we organise ourselves to be a professional, disciplined outfit. Our purpose is not just to make a fast buck and run."

Psion's development facilities include a powerful minicomputer to which all the programmers have access via terminals on their desks. This minicomputer can be instructed to behave like the ZX81, the Spectrum, the BBC, or any other microcomputer you care to name. Psion's programmers can use it to develop software for a new microcomputer before the new machine is even in their hands.

Stored in the minicomputer's memory is a library of thousands of "primitives" — machine code routines that act as the building bricks of Psion's programs. Also held in memory are a range of software "tools" that programmers can use to debug programs.

As well as the development facility in London, Psion has a factory in Telford which deals with all its tape duplicating and production.

But less well-equipped software companies can take heart from the fact that, in terms of the home software market, Psion has been in business for a long time — a whole two and half years, in fact.

It was set up by David Potter who, until then, had been an academic, lecturing in maths and physics at the University of California, then Imperial College, London.

He decided to make the break with academic life because "I could see what was going on in the microcomputer field, and I felt that rather than talk about it, I should get my hands dirty."

He had saved up "a modest amount", and mortgaged his house to raise the rest of the money he needed to finance the venture. Now he says "It was a very speculative thing to have done. I wasn't worried about the money. The difficult thing was to throw up a whole academic career. My colleagues thought I was completely bananas."

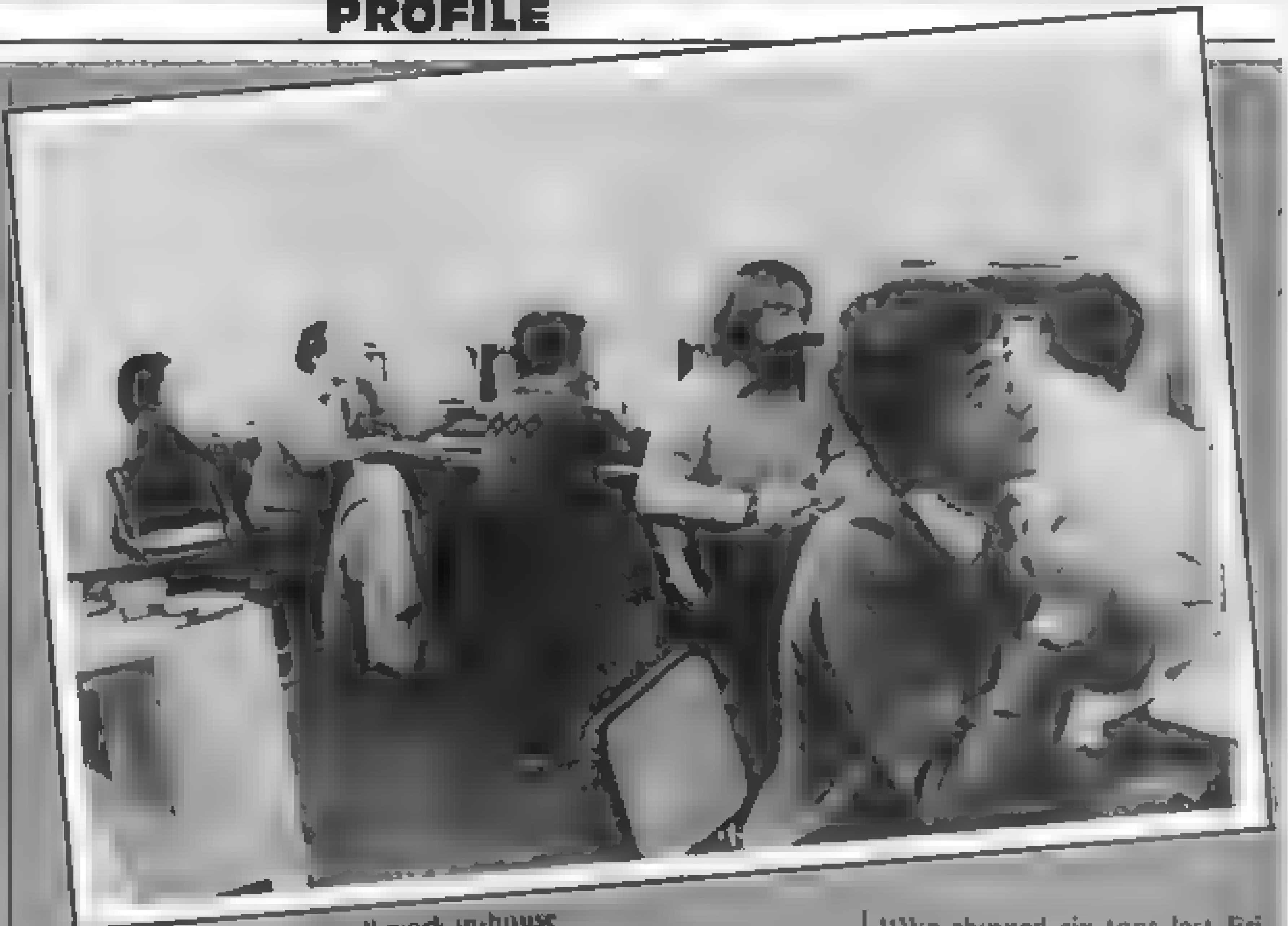
Psion is really three separate companies, one dealing with software, one with hardware and software distribution abroad, and one with hardware development. For the first year, David concentrated on the distribution side, selling small computers in South Africa, where he was born, as well as Zimbabwe, Botswana, Namibia and Lesotho.

Among the machines he was selling was the ZX80, and he became aware of a huge gap in the market for good software for this machine. "the original programs Sinclair put out were nonsense."

He started out by distributing software from other companies, including Microgen, around the world. Then in September 1981, joined by his "right hand man" and former Imperial College colleague Dr Charles Davies, he started developing programs under the Psion label.

Dr David Potter

Dr Charles Davies



Psion's programmers all work in-house

The first programs, including Backgammon for the ZX81 and some Acorn Atom programs, appeared at the beginning of 1982. Now Psion programs feature prominently among the best selling software for the ZX81 and Spectrum, and Psion is one of the few companies to have developed a close working relationship with Sinclair Research.

David said: "We made an agreement with Sinclair to produce high-quality software for the 81 under the Sinclair label. It was announced at the same time the Spectrum was launched, to reassure ZX81 owners that the ZX81 would be supported fully in parallel with the Spectrum.

"We were aware that the Spectrum was coming, and worked with Sinclair to produce Horizons and a wide range of Spectrum software. We dropped everything to get Horizons ready by July".

David sees Horizons as a good example of his aim with software in general — "to open up the eyes of the user to the possibilities of the machine". One side of the tape introduces the Spectrum and its functions, and the other contains a series of games which each show off one aspect of the machine.

Another program he particularly likes is Flight Simulation, currently riding high in the Spectrum software charts. His enthusiasm was shared by one satisfied customer in particular — an RAF squadron leader who wrote in to say how much he had enjoyed playing with the program.

Flight Simulation shares a lot of programming techniques with VU-3D, another best-seller. VU-3D is the first program to allow users to produce three-dimensional models of solid objects, complete with realistic shading, on the Spectrum. It took several programmers five and half months to complete — the equivalent of one programmer working for two and half years — and uses the same principles that are applied in solid modelling systems for much larger computers.

Another Spectrum first to hit the market soon is a version of Scrabble, to which programmers were putting the finishing touches when I visited. The program will have a vocabulary of thousands of words, and is for up to four players — which includes any combination of human and computerised opponents. If you so desire, you can watch four computer opponents play each other, all on different levels of play.

Most of Psion's 16 programmers have computer science or math degrees, and three have PhDs. The odd one out is Stephen Kelly, who is now just 20, and left school at 16 with few qualifications.

He had to leave a job in Curry's warehouse after hurting his back, and was unemployed for two years. Or perhaps unemployed is the wrong word, since he kept himself busy by getting hold of a ZX81 and learning to program in machine code from scratch.

The two programs he sent in to Psion impressed David, and when Stephen phoned in response to one of Psion's ads for programmers, David invited him to London for an interview. He's been with the company ever since. David says of him: "It's amazing to watch him. He's a kind of genius in his own way".

Psion doesn't use any freelance programmers. "We like to concentrate on developing in-house, because we think we can come up with more original ideas that way. Secondly I think the discipline of working in teams is important. We have three or four people working on a project at a time: a project leader and three more junior people".

With a turnover "substantially over £6 million", Psion must be doing something right. "By the ton, we sell more software than anyone", said David. "We shipped six tons last Friday".

As head of a booming software business, does he ever regret leaving the academic world? He said: "Not remotely. I've never had so much fun in my life." ■

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ZX81 AND SPECTRUM PROGRAM

Can you crack the code before time runs out?

Your help is needed to decode secret cyphers from our agents, now MI5's computer can't cope. Ray Elder sets the task

You are in charge of MI5's cypher decoding computer, represented by your ZX81, with a 16K RAM pack, or Spectrum.

The messages which are fed into the computer from agents are words split into two three-letter parts and the order of each part — the number combination — will mean different things to your boss.

Variables

Q$()	array holds 16 half words
A$()	array holds Q$ word halves in random order
S$	string of 32 spaces used to wipe unwanted text
G	counter for number of goes
Y	variable used to hold value of random numbers
S T	used to determine print positions
A B	hold inputs
L K	flags to indicate results of input checks

Hints on conversion

[illegible]

Unfortunately the computer is malfunctioning. Instead of showing a steady display of work parts 1 to 16, it flashes each word up at random.

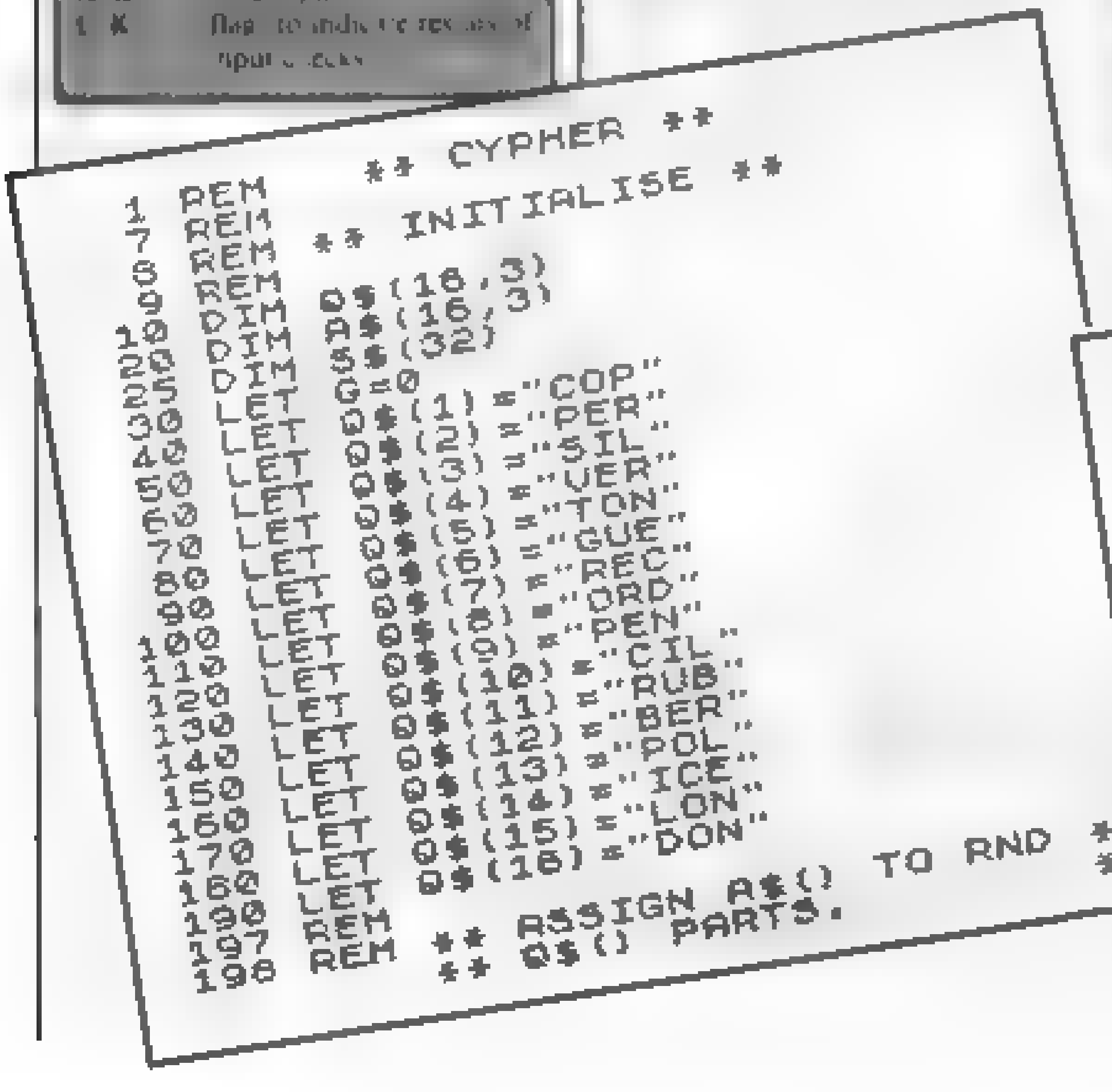
Time is also running out, so you can only have 16 attempts.

Can you match up the number of the two parts of each word . . . or is it the end of civilisation as we know it?

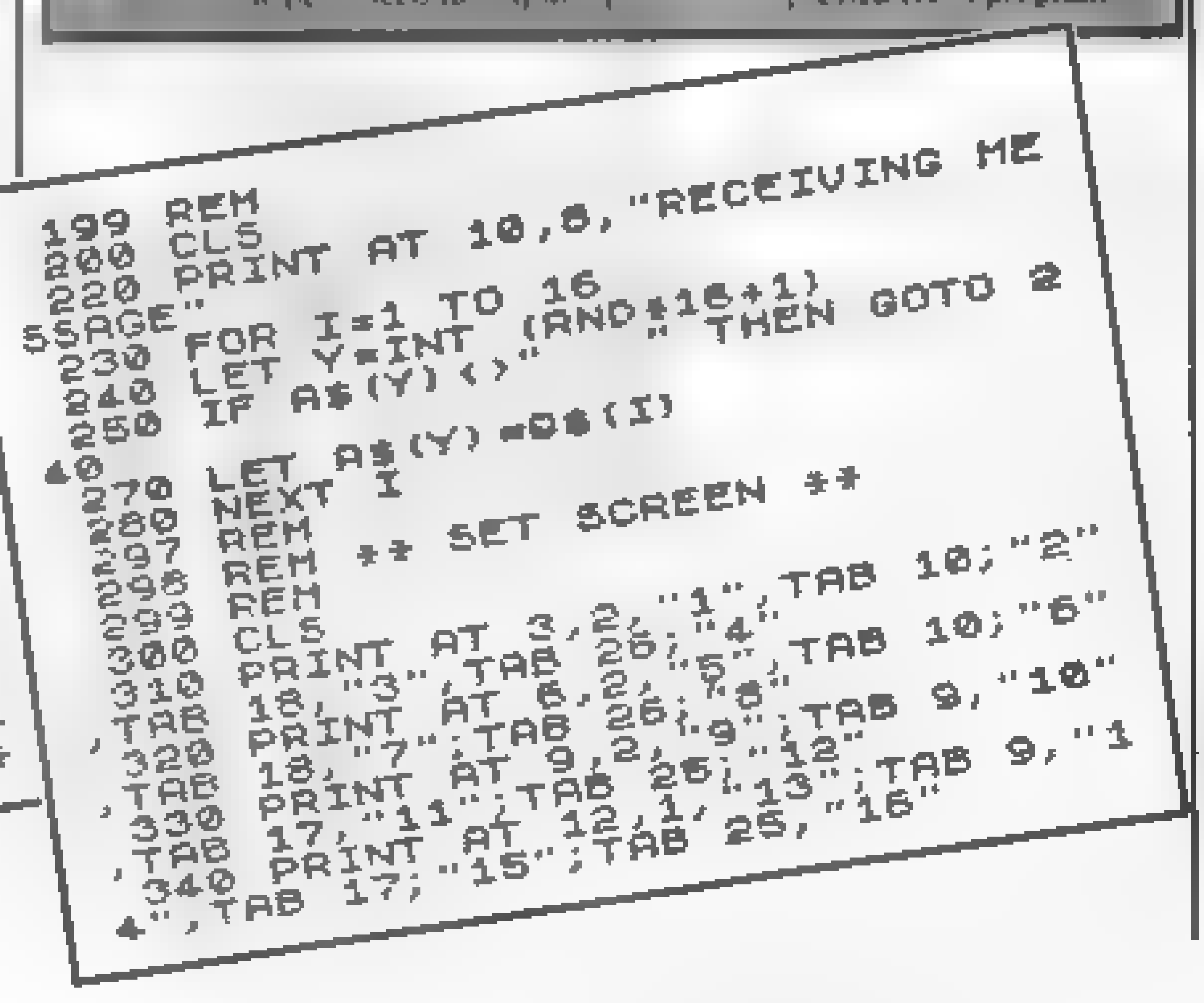
Increase or decrease the number 16 in line 690 to make the game easier or harder

How it works

10-30	dimension two string arrays to hold 16 three-letter groups, set up set up string of 32 spaces, set counter G (for guesses) to zero
40-190	store 16 parts of eight words in Q$(1-16)
200-230	clear screen, print message while word parts transferred to A$(1-16), set up loop of 16 passes
240-300	give Y random value of 1-16, if Y has had that value back to 240, if not transfer Q$(I), next I, clear screen
310-340	print numbers 1-4, 5-8, 9-12 and 13-16 across screen
400-430	print "key press" message 15 lines down, give X random number 1-16, check if number previously correctly matches and if so GOTO 420 (A$(X) is set to three spaces when correct match has been made — lines 800-810), duplicate value of X in S
440-450	reduce value of S to less than 5 to position word horizontally
455-460	form ratio to position word in each horizontal column and exact vertical (based on T) location
470	print word part X rows down, S columns across
480-490	delay loop is optional — when using PAUSE, increase/decrease 10 value to alter display time
500-640	print request for number at row 15, get input (A), wipe first input message, print request for second input at row 17, wipe second input, allocate to C$ both chosen word parts as single word
650-700	loop 1-16 in steps of two, compare C$ with correct word part combinations, if match found GOSUB to "correct" routine, next (check), check flag, if match not found K=0, so GOSUB to "wrong" routine, increase guesses counter by one, check allowed number of tries, if all used GOTO "lose" routine, return to word part routine
800-810	clear the two random word part stores so they are not reprinted
830-860	print correct message at row 16, set "game complete" flag (L) to 0, set up 1-16 loop, check each array A$(I) — if any contain a word set flag L to 1, next array check, wipe "correct" message
870-890	check L flag, if zero all word parts have been correctly matched so jump to "win" routine, set K (correct guess) flag to 1, return to main program
900-910	print wrong message, jump to 835 to use existing code as delay and return, to save rewriting wipe, return etc
1000-1170	clear screen, print "lose" messages, jump to 1050 for replay option, clear screen, print "win" messages, print replay option messages, if no key pressed keep checking by going back to 1160, if key pressed RUN program



```
   1 REM      ** CYPHER **
   7 REM ** INITIALISE **
   8 REM
   9 REM
  10 DIM Q$(16,3)
  20 DIM A$(16,3)
  25 DIM S$(32)
  30 LET G=0
  40 LET Q$(1)="COP"
  50 LET Q$(2)="PER"
  60 LET Q$(3)="SIL"
  70 LET Q$(4)="VER"
  80 LET Q$(5)="TON"
  90 LET Q$(6)="GUE"
 100 LET Q$(7)="REC"
 110 LET Q$(8)="ORD"
 120 LET Q$(9)="PEN"
 130 LET Q$(10)="CIL"
 140 LET Q$(11)="RUB"
 150 LET Q$(12)="BER"
 160 LET Q$(13)="POL"
 170 LET Q$(14)="ICE"
 180 LET Q$(15)="LON"
 190 LET Q$(16)="DON"
 197 REM ** ASSIGN A$() TO RND *
 198 REM ** Q$() PARTS.        *
```



```
 199 REM
 200 CLS
 220 PRINT AT 10,8,"RECEIVING ME
SSAGE"
 230 FOR I=1 TO 16
 240 LET Y=INT (RND*16+1)
 250 IF A$(Y)<>"   " THEN GOTO 2
40
 270 LET A$(Y)=Q$(I)
 280 NEXT I
 297 REM
 298 REM ** SET SCREEN **
 299 REM
 300 CLS
 310 PRINT AT 3,2,"1",TAB 10;"2"
,TAB 18,"3",TAB 26;"4"
 320 PRINT AT 6,2,"5",TAB 10;"6"
,TAB 18,"7",TAB 26;"8"
 330 PRINT AT 9,2,"9";TAB 9,"10"
,TAB 17,"11";TAB 25;"12"
 340 PRINT AT 12,1,"13";TAB 9,"1
4",TAB 17;"15";TAB 25,"16"
```

```
 397 REM
 398 REM ** PRINT WORDS AND **
         ** CHECK FOR INPUT **
 399 REM
 400 PRINT AT 15,0;"PRESS ANY KE
Y WHEN READY."
 410 LET Y=INT (RND*16+1)
 420 IF A$(Y)="    " THEN GOTO 41
0
 430 LET S=Y
 440 IF S>4 THEN LET S=S-4
 450 IF S>4 THEN GOTO 440
 455 LET S=(S+S-1)*4
 460 LET T=3+INT ((Y-1)/4)*3
 470 PRINT AT T,S,A$(Y)
 480 FOR I=1 TO 10
 490 NEXT I
 500 PRINT AT T,S,"    "
 510 IF INKEY$<>"" THEN GOTO 600
 520 GOTO 410
 597 REM
 598 REM ** GET INPUT,CHECK **
 599 REM
 600 PRINT AT 15,0,"ENTER THE NO
.OF THE 1ST. PART."
 610 INPUT A
 615 PRINT AT 15,0;S$
 620 PRINT AT 17,0,"ENTER THE NO
.OF THE 2ND. PART."
 630 INPUT B
 635 PRINT AT 17,0,S$
 640 LET C$=A$(A)+A$(B)
 645 LET K=0
 650 FOR I=1 TO 16 STEP 2
 660 IF C$=Q$(I)+Q$(I+1) THEN GO
SUB 800
 670 NEXT I
 675 IF K=0 THEN GOSUB 900
 680 LET G=G+1
 690 IF G>16 THEN GOTO 1000
 700 GOTO 400
 797 REM
 798 REM ** CORRECT ROUTINE **
 799 REM
 800 LET A$(A)="    "
 810 LET A$(B)="    "
 830 PRINT AT 16,0;"CORRECT ";A;
" AND ";B;" MAKING ";Q$(I);Q$(I+
1)
 835 LET L=0
 840 FOR J=1 TO 16
 845 IF A$(J)<>"    " THEN LET L=
1
 850 NEXT J
 860 PRINT AT 16,0,S$
 870 IF L=0 THEN GOTO 1100
 880 LET K=1
 890 RETURN
 897 REM
 898 REM ** WRONG GUESS **
 900 PRINT AT 16,0,"SORRY, WRONG
"
 910 GOTO 835
 997 REM
 998 REM ** END ROUTINES **
 999 REM
1000 CLS
1010 PRINT AT 10,3;"YOU HAVE RUN
 OUT OF TIME."
1020 PRINT ,,"THE ENEMY WON BY A
 SURPRISE       ATTACK"
1030 GOTO 1150
1100 CLS
1110 PRINT AT 10,3;"YOU SUCCEDED
 IN UNSCAMBLING","THE MESSAGE."
1120 PRINT ,,"THE ENEMY WERE DEF
EATED,THEIR     ATTACK FAILED."
1150 PRINT ,,,,"A NEW MESSAGE IS
 COMING IN.",,"DO YOU WISH TO T
RY TO SOLVE IT",,,"PRESS ANY KEY
"
1160 IF INKEY$="" THEN GOTO 1160
1170 RUN
```

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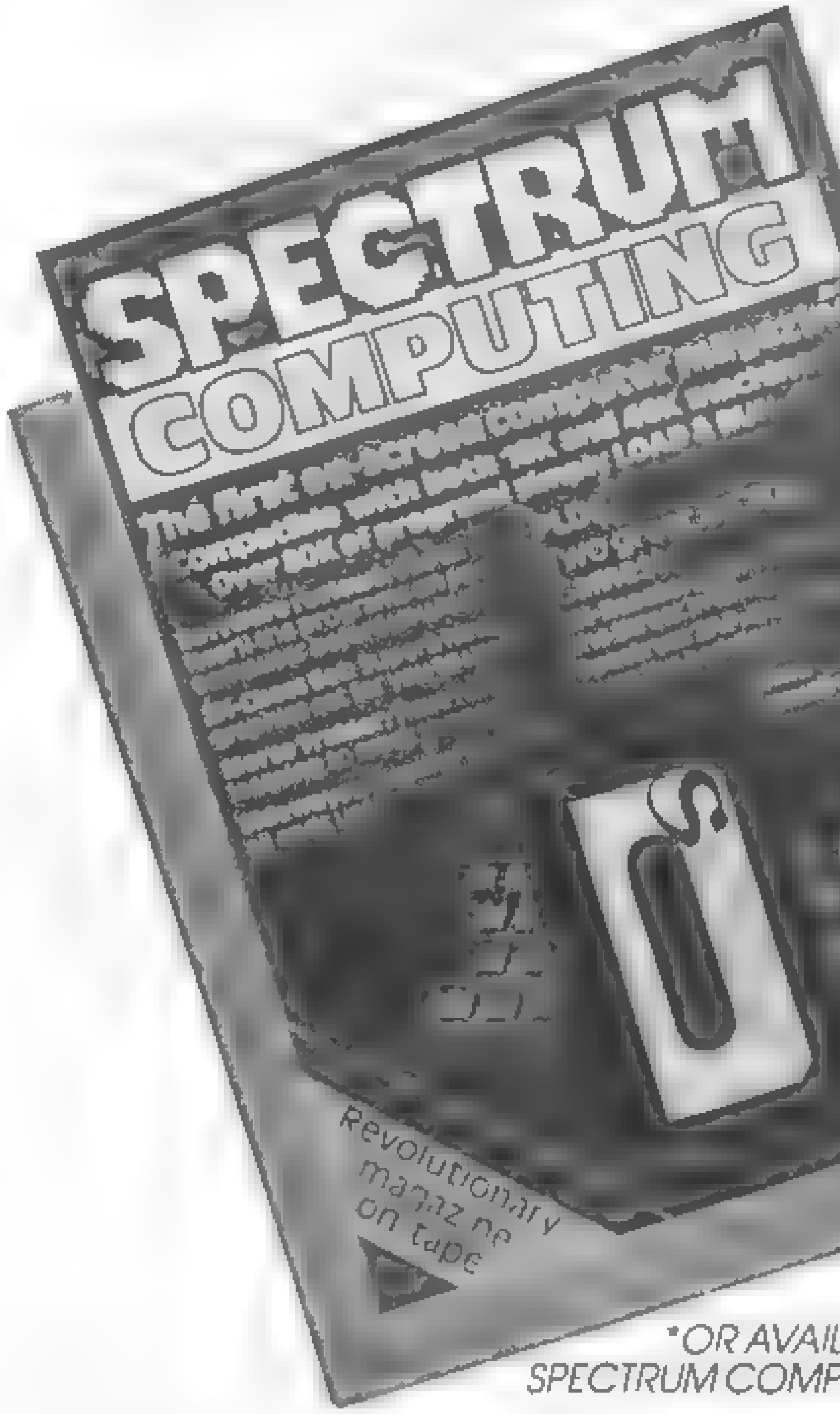

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Find that program with an index

Having trouble remembering just where you saved a certain program? Walter Reed's program will come to your rescue

Searching through a cassette of short programs to find the one you want can be a real nuisance, unless your recorder has a tape counter — and most of the lower-priced models haven't. To add to your problems, you may have forgotten what is on the cassette anyway

My index program for the BBC micro, if SAVEd at the beginning of your cassette, will tell you just what the cassette is holding — plus any other comments that you wish to record. It also lets you locate the right program without the need for a tape counter.

It does this by using the BBC's built-in time clock to control the cassette recorder, switched to Fast Forward, and wind it on automatically to the right place on the tape.

As well as programs, the program could be used to index names and addresses, subscriptions, housekeeping and so on. The procedures that it is made up of can be used separately, by merging them into your own programs for data selection and tabulation. The digital countdown clock could be used in lab work, testing or games programs

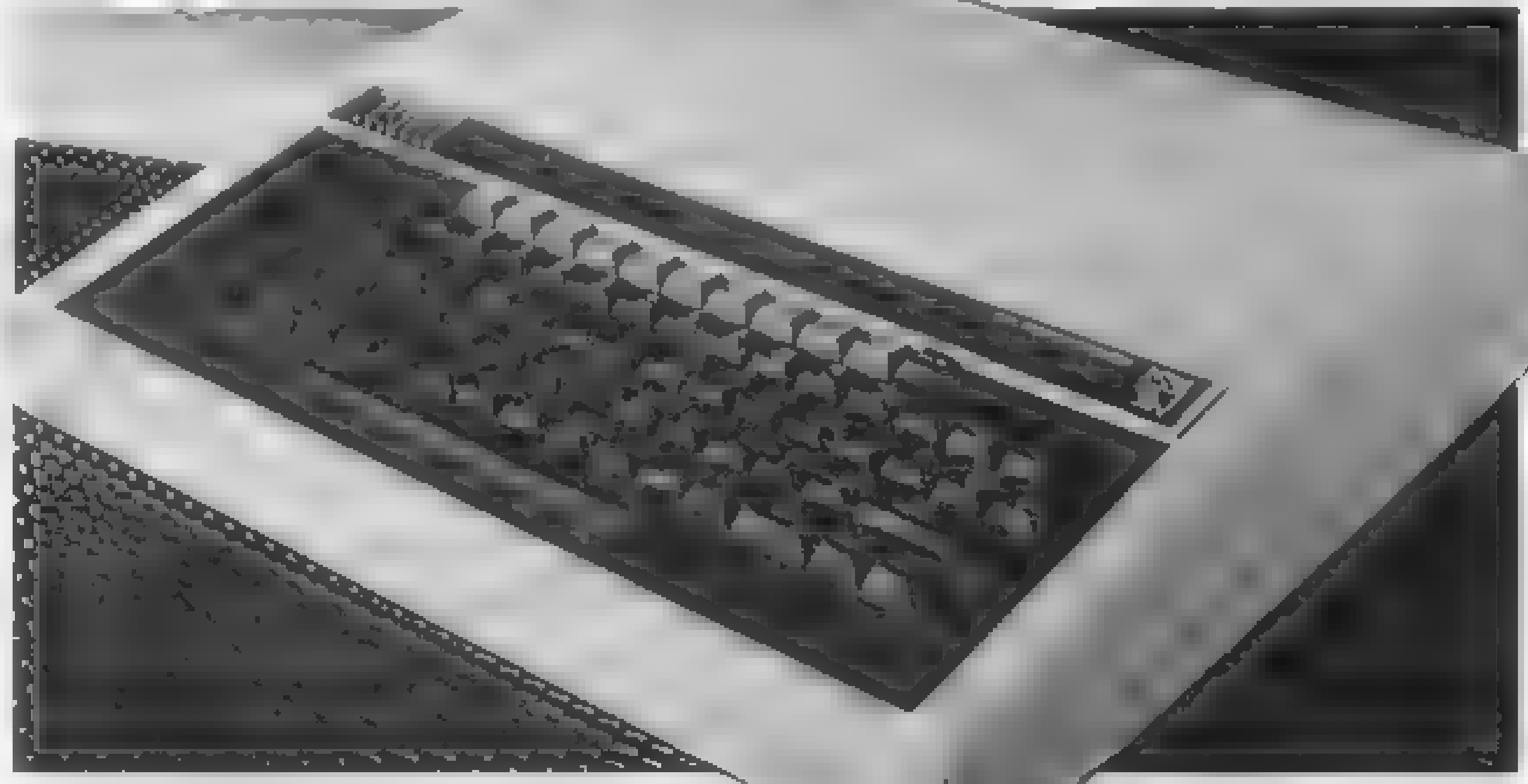
The procedures are listed in lines 40-130, using Mode 7 colour. The listing has already been compressed to take up only 2K of RAM, but further memory savings could be made by taking out the REMs and colour characters, and using shorter PROC names.

To set up the index times, the easiest method is to enter dummy DATA statements with time intervals of 10 to 20 seconds in column 3 of the array. Bear in mind that the tape is gradually moving faster towards the end of the cassette, and while experimenting use *CAT: instead of CHAIN in line 130.

The screen display allows for 21 items (L%) in the list, which should be enough for a C60 cassette. It may be helpful to add the index program at the full end of the cassette and use fast rewind times in the last column of the DATA statements.

You may want to keep the program in memory for continuous use. Providing the program to be selected does not take up too much memory, then PAGE boundary may be reset to PAGE=TOP +&100 before CHAINing the new program.

The index can be redisplayed and a further selection obtained simply by returning PAGE= &EOO and RUN.



```
 10REM "INDEX" program by T.Walter Reed 1983
 30MODE7
 40PROC_intro
 50PROC_data
 60PROC_index
 80IFVAL(index$(A%,2))(=3THEN120
 90PROC_select
100IFY$()"Y"THEN60ELSEVDU7 CLS
110PROC_countdown
120PROC_play
130CHAINindex$(A%,0)
140END
150
170DEFPROC_index
180CLS PRINTTAB(0,1)CHR$130;"NUMBER     TITLE      BLOCK   FFWD TIME"
190FORI%=0TOL%
200PRINTTAB(3,I%+3)CHR$131;I%;
210FORJ%=0TO2:PRINTTAB((J%+1)*11,I%+3);index$(I%,J%,.
220NEXTJ%:PRINT
230NEXTI%:PRINT
250PRINTTAB(0,24)CHR$131;CHR$157;CHR$130;"SELECT ITEM NUMBER  ";:INPUT A%:VDU7
270IFA%(0ORA%)L%THEN180
```

▶

```
 280ENDPROC
 290
 400DEFPROC_select
 410CLS:PRINTTAB(0,12)CHR$132;CHR$157;CHR$135;A%
 420FORJ%=0TO2
 430PRINTTAB((J%+1)*11,12)index$(A%,J%);:NEXTJ%
 440PRINTTAB(0,16)CHR$131,CHR$157,CHR$132,"Please confirm selection   Y/N ";
 450Y$=GET$
 460ENDPROC
 470
 700DEFPROC_countdown
 710PRINTTAB( 0,18)"Set tape to F/FWD & press any key"
 720Y$=GET$:VDU7:*M.1
 730VDU23;11,0;0;0
 740time=TIME/100+VAL(index$(A%,2))
 750PRINTTAB(2)"COUNTDOWN ";
 760REPEATPRINTTAB(13,21)INT(time-TIME/100)"   Seconds",
 770UNTILTIME/100>=time
 780*M.0
 790ENDPROC
 [redacted]
1100DEFPROC_play
1110CLS
1120PRINT'''CHR$132;CHR$157;CHR$135;"   Are you READY then..."
1130VDU23;11,255;0;0,0
1140SOUND1,-10,89,10:SOUND1,-10,77,10
1150SOUND1,-10,61,10
1160PRINT''CHR$130;CHR$157;CHR$135,"   Set tape to 'PLAY'..."
1170PRINT''CHR$131;CHR$157;CHR$132,"   Press spacebar to 'CHAIN' program"
1180IFINKEY(-99)=-1THEN1190ELSE1180
1190 ENDPROC
1200DEFPROC_intro
1210L%=20
1220DIMindex$(L%,2)
1230ENDPROC
1240
1300DEFPROC_data
1310FORI%=0TOL% FORJ%=0TO2
1320READindex$(I%,J%)
1330NEXTJ%,NEXTI%
1340ENDPROC
1350
2000REM  Index of TDK D60
2010REM BUGFIX + INDEX head tape
2020DATA INVADERS  ,15EE, 6
2030DATA VOYAGER   ,0A97,28
2040DATA MOONLANDER,0868,36
2050DATA PTERAGON  ,0939,42
2060DATA BLAST     ,0808,50
2070DATA DAMBUSTERS,07E6,60
2080DATA OBSTACLE  ,04B3,70
2090DATA SQUISH    ,076D,80
2100DATA MORSE     ,0CEB,90
2110DATA VOYAGER   ,0A97,100
2120DATA 3D_SURFACE,0260,110
2130DATA ELLIPSE   ,0358,120
2140DATA MOONLANDER,0868,130
2150DATA POLYGON   ,0152,140
2160DATA SQUARE    ,0185,150
2170DATA CHORDS    ,023E,160
2180DATA SPIRAL    ,0327,180
2190DATA INVADERS  ,15EE,190
2200DATA 0         ,   0,100
2210DATA 0         ,   0,100
2220DATA DUMMY     ,   0,999
2230REM SET PAGE=TOP+&400 TO RESERVE SPACE FOR INDEX BEFORE 'CHAINing'
```

QUEST FOR ANY SPECTRUM

SIMPLY THE BEST

THE BLACK HOLE

THE SCENE: Alien spacecraft are using hyperspace drive to enter our universe through a black hole. Their intent is destruction.

YOUR MISSION: To uphold the defence of your universe as long as possible while inflicting the maximum damage on alien forces.

YOUR WEAPONS: Positive and Negative Ion Guns are deadly at any range but the Ion stream is bent by the massive gravitational field of the black hole. The Neutron Blaster is equally deadly but has only limited range.

YOUR BATTLE: You are under constant attack from the alien force which pits fiendish offence craft against you in ever increasing intensity, in deadlier and deadlier form.

How long can your fleet of ships survive? How many enemy craft can you destroy?

100% super efficient machine code allows all this action to be packed in to run on the 16K (or 48K) Spectrum. Superb animation, high resolution graphics, incredible explosive and full sound effects combine to make "Black Hole" set a new standard in Spectrum software.

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Game design and dragonware: R. Lowry

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Game design and dragonware: R. Lowry

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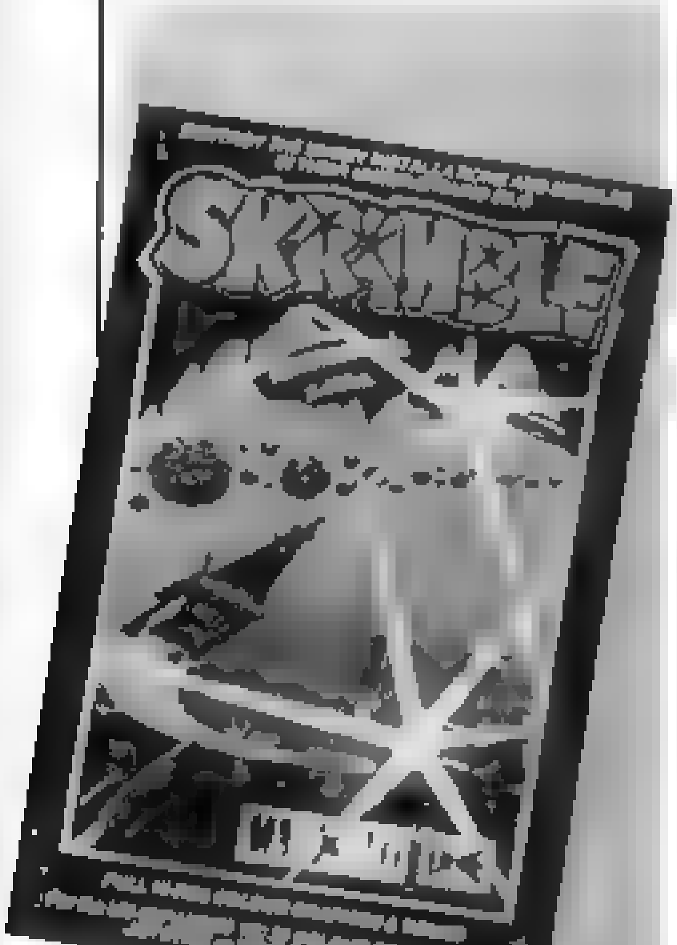
Game for action—with your VIC-20

Our panel look at new games, at a range of prices, for the VIC-20. This is what they think of them...



Laser Zone VIC-20 plus 8K £6

Llamasoft, 49 Mount Pleasant,
Tadley, Hants RG26 6BN

The aliens have landed, they're marching to get you - what can you do? Bludgen them with an Electro, or swing your Plasma Cannon with speed and finesse and pick them off. Give me the bludgen any day, but supplies of Electros are severely limited . . .

"Your objective: simply to vaporise as many nasties as you can before you are yourself rendered into your component atoms", says author Jeff Minter about his latest offering. Straightforward enough, considering you control two spaceships armed with those Plasma Cannons

Snag is, the aliens that evade your crossfire to reach the tracks on which the ships manoeuvre are then out of your normal fire-field. You must either turn a ship to fire diagonally or hope there's just one more Electro up the tube

All of which makes this fast, innovative game a pretty tough test of coordination skills, and while good fun for all, it will perhaps be most appreciated by those who take their games seriously

Sound is effective, graphics attractive and clear (even in monochrome). I encountered no bugs or loading difficulties. The program has plenty of features, 31 skill levels (plus training mode), and comes with particularly full instructions — which you need. You also need a good joystick and, like the adverts say, dedication! **M.P.**

instructions	90%
playability	70%
graphics	80%
value for money	90%

★★★★

Melbourne House
software for the standard
VIC 20
GAMES PACK
5 GREAT GAMES

Scramble £7.95

Sumlock, Royal London House,
198 Deansgate, Manchester M3
3NE

In the fast-moving machine-code game, you must fly your fighter/bombers into an enemy underground silo and destroy weaponry and stores Control is via keyboard or joystick.

Missiles are sent up in attack, but you are armed with a forward-firing cannon and also have a bomb load to use. Low level attack is recommended so as to shoot ground reserves and to accurately place the bombs (dispersed with the space bar).

Hitting an enemy missile is worth 50 points (20 if it is still on the ground), fuel base — 100 and moon bases are worth between 100-300 A further 10 points are added for each mile you penetrate the silo.

The graphics, colour and instructions are excellent, but the sound effects are spoilt by a monotonous fanfare. Two further gripe are that it takes two keyboard entries (F1 and C) to restart the game, and there is no high score record kept

But overall, a first-rate version of a popular game **V.R.**

instructions	90%
playability	85%
graphics	90%
value for money	80%

★★★★

VIC-20 Games Pack £5.95

Melbourne House, 131 Trafalgar
Road, Greenwich, London SE10

This cassette bears the legend "Five great games for the standard VIC 20". While I would go along with the claim that the tape contains five games which all fit a standard VIC, I cannot agree that they are all "great"

The five are standard implementations of well known arcade favourites: Invaders, Ground Attack, Storm, Alien Blitz (Galaxians) and Space Rocks (Asteroids). All instructions for play are contained on the cassette inlay and include a short scenario of each program. In some cases this turned out to be more exciting than the games themselves.

Space Rocks and Alien Blitz stand out as being the most effective games on the cassette Unlike the other games, they are written in machine code and therefore can almost match the complexity and speed of the originals. The other games were mainly Basic programs which were, to my mind, far too slow to be interesting, and rapidly became boring to play

The author of these games obviously has a lot of talent when working in machine code, and if all of the games had been written to the same standard as Space Rocks this review would have been quite different. Since they weren't, I cannot honestly recommend this package.

M.B.

instructions	70%
playability	30%
graphics	80%
value for money	30%

★

▶

Pharoah's Tomb
VIC-20 plus 16K
£6

Anirog, 26 Balcombe Gardens,
Horley, Surrey

This is a purely graphical adventure, in which you use the keyboard to control a little man who searches a pyramid for various objects.

His quest takes him into a series of maze-type screens in which are various nasties who delight in sapping his strength. Instant death also lurks in the form of different traps.

Many adventures are criticised for the use of text only. I must criticise this game for the converse — the only time text is used is when your death is announced. I would have liked to have seen simple messages telling you what the objects were and what they could do for you. Secondly, whereas in most adventures you can anticipate a hazard and sometimes avoid it, in Pharoah's Tomb you are liable to be bumped off at any time. Instant death without warning is so frustrating — especially when you have a long game to reload.

Very good multicolour mode graphics, but overall a rather frustrating and unsatisfying game. **A.W.**

instructions	50%
playability	60%
graphics	75%
value for money	60%

★★★

The Wizard and the Princess
£5.95

Melbourne House, Glebe Cottage, Glebe House, Station Road, Cheddington, Beds LU7 7NA

"... This program will show you the extent of the possibilities for the VIC 20, both in terms of graphics and in terms of going beyond the memory limitations of the standard machine..." Thus begin the notes accompanying this five-part "adventure". Fortunately the program itself is better written.

In chapter one you wander slowly through some pretty countryside, looking for the wizard's castle. It is rather hard not to find it, and success is rewarded with a "Press shift run-stop" message; on doing so you are propelled into chapter two. Here you are expected to stab a particularly handsome dragon in the throat, and unpleasantly easy it is too.

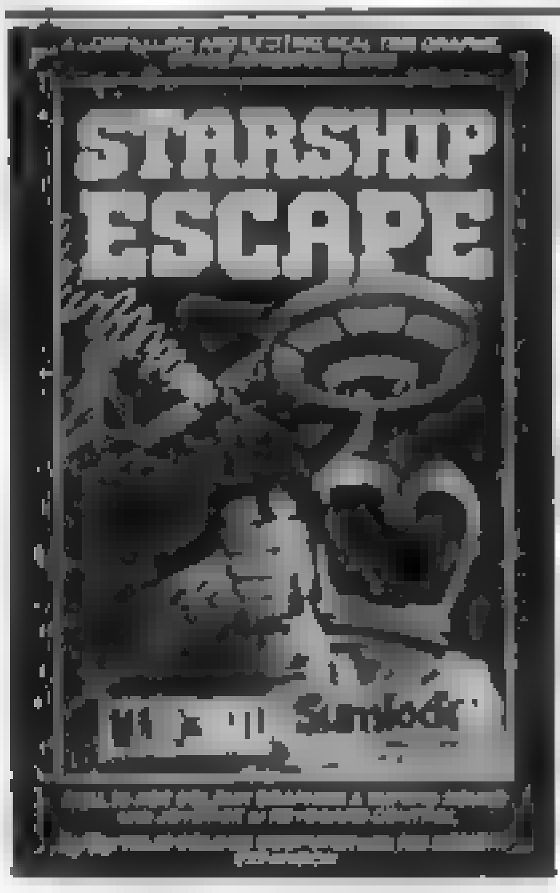
Chapter three is something else again; a three dimensional maze of great complexity and size. The program note suggests that you draw a map as the labyrinth is explored, and a good idea this is. The maze is very difficult to solve even so, but enjoyable all the while.

Chapter four lapses into mediocrity with a hunt for a blob (or "monster", as the program has it) in various rooms of the wizard's castle, and the program goes out on a low note with a very uninspired "poke the troll in the midriff" game.

Good use of program-defined graphics is not enough! Only the 20 × 20 maze redeems this adventure, but redeem it it does. Melbourne House is clearly aware of the great marketing potential of adventure games at present, but competition is stiff and standards high. Higher than this. **T.D.**

instructions	95%
playability	70%
graphics	70%
value for money	40%

★★



Starship Escape
VIC-20 plus 16K
£9.95

Sumlock, Royal London House, 198 Deansgate, Manchester M3 3NE

This game is a hybrid — a graphical adventure which requires the fast reactions associated with arcade games.

You are the pilot of a space ship which has been captured by an alien craft. Your ship has been dismantled and the pieces distributed throughout the alien ship. Using either joystick or keyboard, you must wander through the ship, find the pieces, collect them in the air lock and reassemble them.

There are a number of nasties including androids, robots and space spiders in the rooms, all which are determined to stop you succeeding. As you enter each room you are given an aerial view and must either avoid the enemy using cunning or shoot it with your laser. Not all enemies, however, can be shot.

The search starts at the air lock and you are returned there if you are captured by one of the opposition. K9, the robot dog of Dr WHO fame, will help you in your task.

The game uses good graphics and is fast and frantic. A high degree of agility and good tactics are required to avoid the enemy. On the whole an excellent game which should appeal to most age groups. **A.W.**

instructions	90%
playability	90%
graphics	85%
value for money	80%

★★★★

Krazy Kong
VIC-20 plus 16K
£6.00

Anirog, 26 Balcombe Gardens,
Horley, Surrey

Since the arcade version of this game is one of my favourites, I reviewed this tape with interest. I was not disappointed.

In case you haven't played the arcade game, it works like this: You take the role of a small man trying to rescue a kidnapped maiden from the giant gorilla.

The gorilla is lurking at the top of a series of platforms linked by ladders, and your man must try to get to the top.

He also has to avoid being crushed by barrels rolled down the platforms by the gorilla, or smash them using small mallets he picks up on the way. He can also win extra points by collecting baskets or umbrellas as he goes.

This is a faithful copy of the original and, bearing in mind the limitations of the VIC, uses excellent multicolour graphics.

If you reach the top of the screen, a new configuration of platforms is drawn. Screen three included an elevator which, due to a bug or my ineptitude, I'm not sure which, I was unable to mount. So beyond this screen, I can't comment.

Animation is smooth and fast with either joystick or keyboard control. A standard hall of fame is available for high scores.

A.W.

instructions	60%
playability	75%
graphics	90%
value for money	90%

★★★★

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Catterpillar
£5.95

CDS Systems, 10 Westfield Close,
Tickhill, Doncaster, South Yorks.
DN11 9LA

A blue spider, a green flea, a red scorpion and a purple caterpillar are your main foes in this game. Try to destroy the caterpillar a segment at a time as it descends on you through a field of mushrooms. If it touches your gun, you are dead

Each time the caterpillar touches a mushroom it moves one stage lower — and if the mushroom is red, it drops straight to the bottom of the screen.

While all this is going on, a yoyo-esque spider is doing its utmost to bounce on you, while clearing the mushrooms from the bottom of the screen. If it succeeds, the flea comes hurtling down, leaving a trail of mushrooms behind it.

Points are scored for destroying anything on the screen except yourself in this highly complicated arcade game — which could be highly enjoyable too, were it not for the limitations of the Spectrum keyboard.

A joystick is a must for a game like this, but the program doesn't provide for one. Matters aren't improved by the keys chosen for control. With one hand on the cursor keys and the other on the bottom row for firing, you could tie yourself in knots once the action hots up. A good game, let down by its hardware.

N.W.

instructions	85%
playability	65%
graphics	90%
value for money	75%

★★★

Cyber Rats
£5.95

Silversoft, 20 Orange Street, London WC2H 7ED

In this derivative of our old friend Centipede, deadly rats advance on you from the top of the screen. If they touch you, you lose a life (you have three to start with).

The rats appear at the top right and top left of the screen, and travel across until they reach the other side or encounter a tuft of grass. At this point they jump down to the row below.

You can move left, right, up and down, and fire at the rats as they advance (you use the 0 key for this, a point the instructions fail to mention). If you manage to clear them all, a larger swarm appears..

Every now and then an easily avoidable purple killer rat drops down to add variety.

No problems loading, and you can play either from the keyboard or from an AGF or Kempston joystick. One or two players can take part, each player's turn ending when he/she loses a life. The highest score is recorded, but not the player's name.

Reasonably interesting, but unmemorable graphics, and lacking the addictive qualities that have made similar games so successful. Disappointing for the price.

P.F.

instructions	50%
playability	75%
graphics	50%
value for money	60%

★★

Muncher
£5.95

Silversoft, 20 Orange Street, London WC2H 7ED

Another Pacman-type game in which you try to avoid four ghosts by running round a maze. The only unusual feature in this otherwise standard version is that the maze pattern varies each time it is drawn.

Each time you clear the energy dots and redraw the maze, you and the ghosts speed up. A bonus fruit materialises from time to time in the centre of the maze . munch it if you can, the extra points are worth the trouble!

The program loaded every time and the difficulty levels progress smoothly, so that even a newcomer to the game can get some feeling of achievement. A high score is recorded, but not the name of the high-scoring player.

Muncher is let down by its instructions, which give the wrong control keys: S starts a new game, not 5, and M, not N, moves you down

Fair graphics, especially considering how small the ghosts etc are. An addictive game, and a good introduction to the "race, chase and gobble" brigade. But with so many similar games on the market, I would have liked to see more variety and imagination.

P.F.

instructions	50%
playability	85%
graphics	65%
value for money	75%

★★★

Orbiter
£5.95

Silversoft, 20 Orange Street, London WC2H 7ED

Immediately recognisable as a version of the popular Defender arcade game, Orbiter incorporates many of the features of the original, such as Landers, Mutants, and the small scale display of the overall battle area.

Since these features are not mentioned in the brief instructions, it was only after consultation with a confirmed Defender fan that the full scope of the game was understood.

It then emerged as quite entertaining, if slightly frustrating game, notably in the fact that the score message kept changing colour, and in some colours was quite unreadable.

The Defender fan remarked that it was difficult, if not impossible, to position the defending ship so that attacks from the rear could be detected in time to take evasive action, but that could be seen as part of the fun

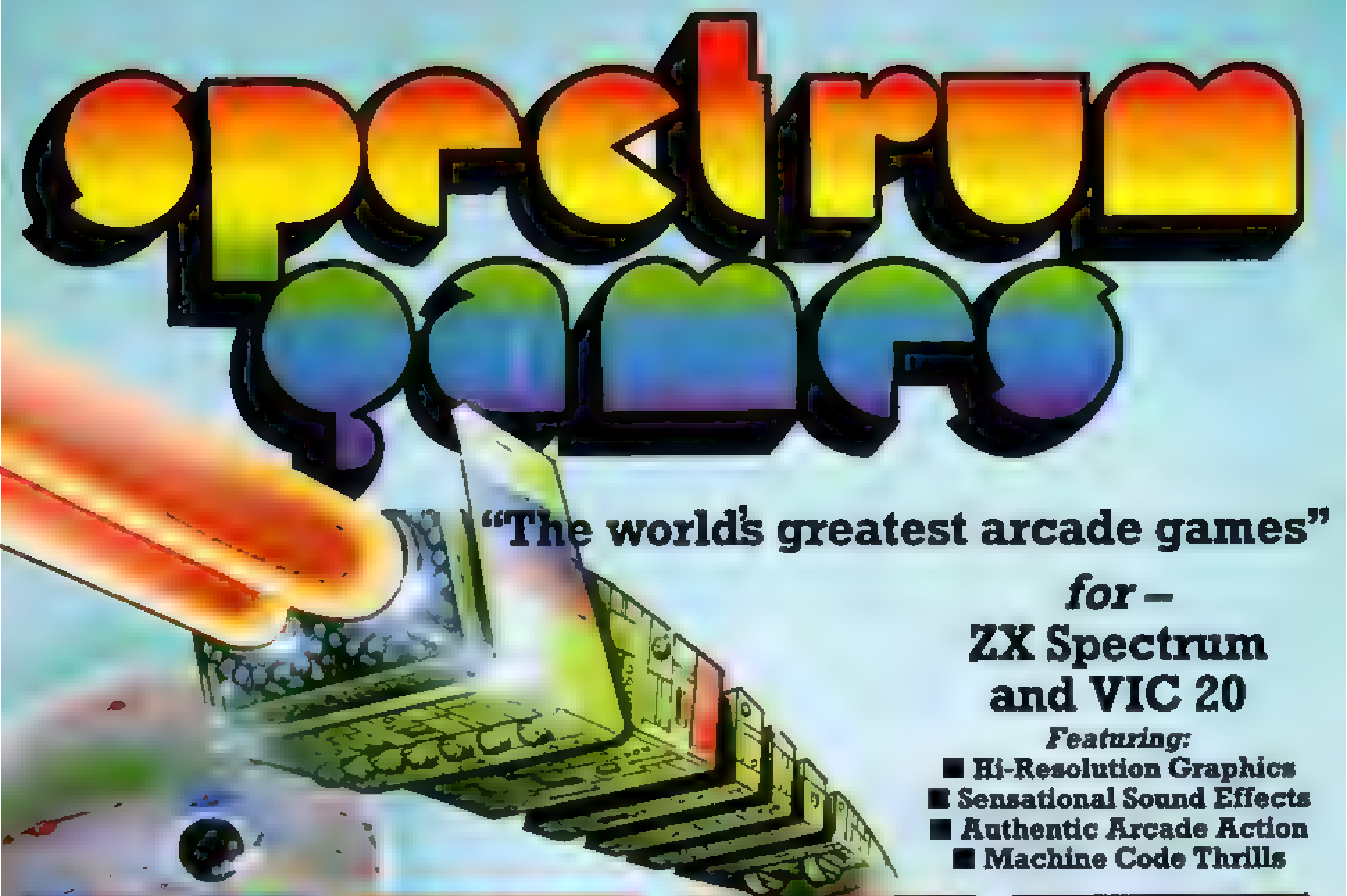
The program loaded without difficulty, though the instruction to CLEAR 25102 before loading was a little surprising, not being needed with other machine code programs. Seven control functions were available, each controllable by a separate group of keys in the keyboard matrix.

Basically a good game, which would nevertheless benefit from slight revisions and an adequate explanation.

D.T.

instructions	40%
playability	80%
graphics	70%
value for money	75%

★★★



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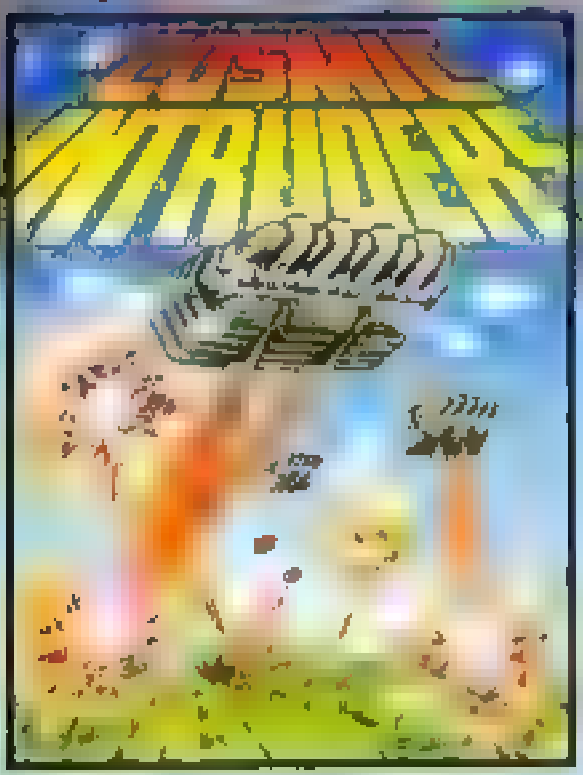

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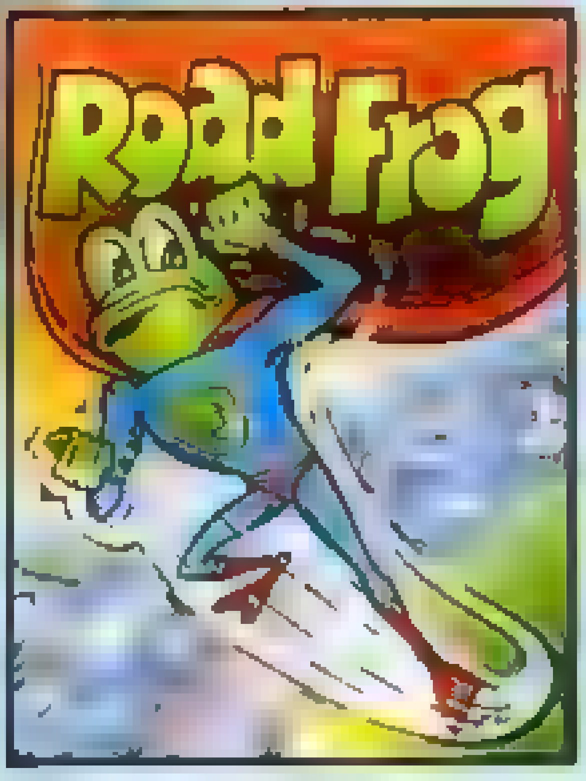

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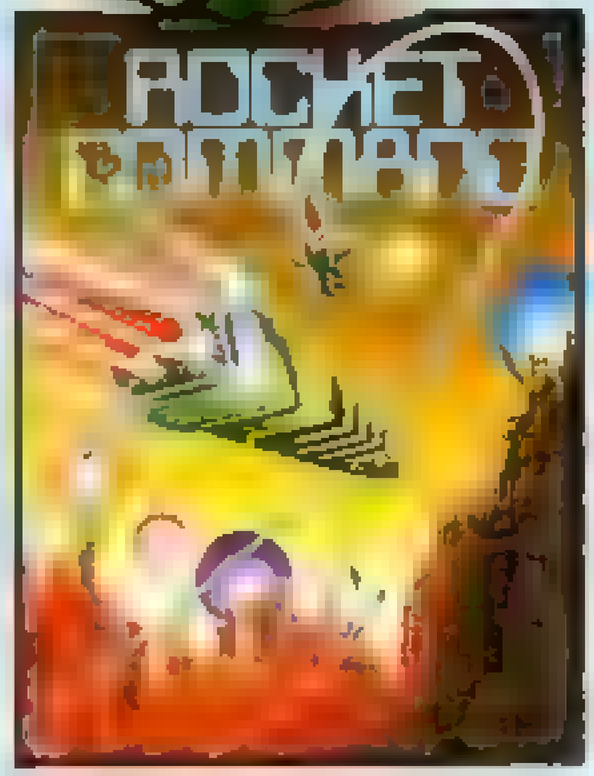

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Let your Dragon loose with depth charges

Not enough Dragon 32 programs are being published, said Ian Sellman. So he sent in his own simple Subchase game

Subchase puts you in charge of a ship with a mission to hunt submarines and destroy them with depth charges.

The left and right cursor keys control the ship's movement and the @ key drops the depth charges.

You are armed with 10 depth charges and if you drop one and miss that depth charge is, of course, lost. But if you hit the sub your charge is replaced.

And there's a bonus of two extra depth charges once you've destroyed 10 submarines.

To make the game more interesting, every time you hit a sub it randomly changes speed.

Unlike many games of this type, when you drop a charge the sub and ship movement isn't halted — it does slow slightly — so this has to be taken into account while playing.

Entering the listing should not cause many problems. The introduction and end texts may need altered spacing so you don't have half a word on one line and the rest on the line below. These sections are lines 40-60 and 850-920.

Instructions appear when you run the program and pressing a key shows which keys to use. This information remains on the screen for about eight seconds while the high-resolution screen is set up.

When this appears you see the sub moving at the bottom of the ocean. The ship doesn't appear until you move it, then it shows randomly on the surface.

The game ends when you run out of depth charges and there's a comment on your score. Average is 10-20 subs sunk.

I've only twice reached this score, but I haven't yet had a lot of time to play it.

How it works

10-130	title pages
140-190	dimension arrays
200-340	set up hi-res screen
350-540	submarine movement and ship movement
540-710	depth charge drop routine
720-840	hit routine
850-920	END routine

Hints on conversion

This program isn't easy to convert as it uses high-resolution graphics. So if you don't own a Dragon or a Tandy Colour Computer, I suggest you completely rewrite lines 200-340, 360, 440, 500, 520, 600-640 and 720-820.

For the brave who attempt a conversion, here are a few points:

- GET and PUT takes a section of screen and puts it back anywhere on the screen.
- The PRINT @ command prints at any of 512 points on the screen, which is made up of a 32 by 16 display
- The Dragon doesn't require the command LET, so if your machine does you will have to insert it at the required points.
- ASCII codes 8 and 9 are the codes for the cursor keys on the Dragon
- This program takes up just over 12.5K of memory, but most of this is used by the graphics.

▶

DRAGON 32 PROGRAM

```
10 REM*SUBCHASE**BY I.C.SELLMAN*
20 CLS
30 PRINT@10,"SUBCHASE"
40 PRINT@42,"========"
50 PRINT@96,"YOU ARE THE CAPTAIN OF A NAVY   SHIP. YOU HAVE TO DESTROY AS     MAN
Y SUBMARINES AS YOU CAN. YOU START WITH TEN DEPTH CHARGES AND LOSE ONE EVERYTIME
 YOU MISS A  SUBMARINE. BUT YOU RECIEVE TWO  EXTRA CHARGES FOR EVERY TEN "
60 PRINT@320,"SUBMARINE YOU DESTROY"
70 PRINT@448,"PRESS ANY KEY TO CONTINUE"
80 IF INKEY$=""THEN80
90 CLS
100 PRINT@8,"SUBCHASE CONTROLS"
110 PRINT@40,"======== ========
120 PRINT@128,"TO MOVE RIGHT PRESS          '->'
130 PRINT@224,"TO MOVE LEFT PRESS           '<-
140 PRINT@384,"TO DROP CHARGE PRESS          @
150 PCLEAR8
160 X1=RND(220)
170 DIMA(15,9)
180 DIMSHIP(15,9)
190 DIMB(27,8)
200 DIMC(27,8)
210 PMODE3,1:PCLS:COLOR3,3
220 LINE(0,50)-(256,50),PSET
230 PAINT(0,51),3,3
240 DRAW"BM20,20;S4G4L10H4R15D4BU4BL4U5L2D5"
250 DRAW"S9BM100,100;G4R10E1H1L4U2L2D2L4G1F1"
260 PAINT(105,99),4,4
270 PAINT(17,17),4,4
280 GET(200,100)-(227,108),C,G
290 GET(21,20)-(6,11),SHIP,G
300 PUT(21,20)-(6,11),A,PSET
310 GET(98,92)-(125,100),B,G
320 PUT(98,92)-(125,100),C,PSET
330 SCREEN1,0
340 R=10
350 M=10
360 FORX=10TO220STEPR
370 PUT(X,180)-(X+27,188),B,PSET
380 FORT=1TO2
390 A$=INKEY$
400 IFD1=1THENGOSUB610ELSEFORD=1TO100:NEXTD
410 IFM<1THEN860
420 IFA$=""THEN520
430 IFA$="@"THENGOSUB560
440 IF ASC(A$)<>8ANDASC(A$)<>9THEN520
450 PUT(X1,40)-(X1+15,49),A,PSET
460 IFASC(A$)=8THENX1=X1-10
470 IFASC(A$)=9THENX1=X1+10
480 IFX1<10THENX1=10
490 IFX1>240THENX1=240
500 IF MC=10 THEN M=M+2:MC=0
510 PUT(X1,40)-(X1+15,49),SHIP,PSET
520 NEXTT
530 PUT(X,180)-(X+27,188),C,PSET
540 NEXTX
550 GOTO360
560 IFD1=1THENRETURN
570 D1=1
580 DE=55
590 X2=X1
600 RETURN
610 CIRCLE(X2+5,DE),5,4
620 PAINT(X2+5,DE),4,4
630 FORA=1TO10:NEXTA
640 CIRCLE(X2+5,DE),5,3
```

```
650 PAINT(X2+5,DE),3,3
660 DE=DE+10
670 IFDE<185THEN RETURN
680 FORD=0TO27
690 IF X=X2-D THEN GOTO730
700 NEXTD
710 M=M-1
720 D1=0 RETURN
730 PCOPY1TO5:PCOPY2TO6:PCOPY3TO7:PCOPY4TO8
740 PMODE3,5:SCREEN1,0
750 FORP=1TO10
760 FORA=0TO1
770 SCREEN1,A
780 SOUND100,2
790 NEXTA,P
800 PCLS
810 S=S+1
820 MC=MC+1
830 PMODE3,1:SCREEN1,0
840 R=RND(40)+10
850 D1=0:RETURN
860 CLS
870 PRINT@128,"YOU HAVE RUN OUT OF DEPTH        CHARGES. YOU SUNK",S,"SUBMARINES
"
880 IF S<6 THENPRINT@256,"YOU DONT DESERVE TO BE CAPTAIN"
890 IF S>5 AND S<11 THENPRINT@256,"YOUR SHIP SUNK LESS SUBMARINES  THAN ANY OTHE
R SHIP IN THE FLEET"
900 IF S>10 AND S<21 THEN PRINT@256,"YOUR PERFORMANCE WAS ONLY        AVERAGE"
910 IF S>20 AND S<31 THEN PRINT@256,"YOU DID WELL"
920 IF S>30 THEN PRINT@256,"YOUR SHIP SUNK MORE SUBMARINES  THAN ANY OTHER IN TH
E FLEET"
930 PRINT@448,"WOULD YOU LIKE ANOTHER GO(Y/N)":INPUTM$:IFM$="Y"THENGOTO150
```

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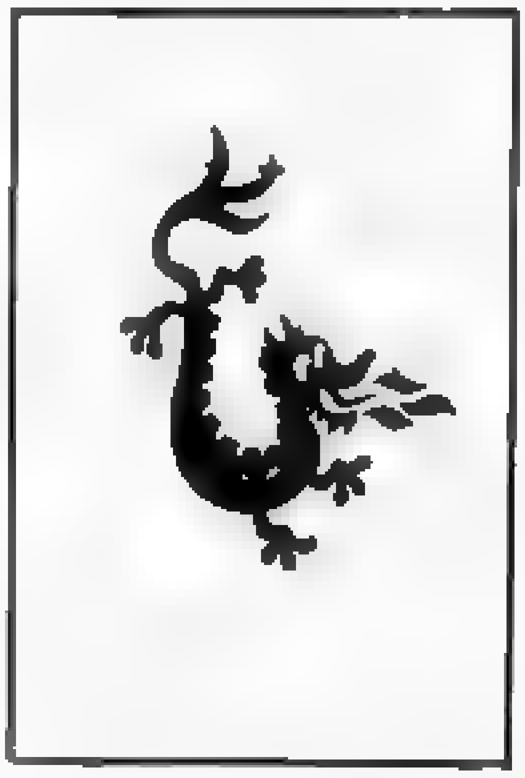

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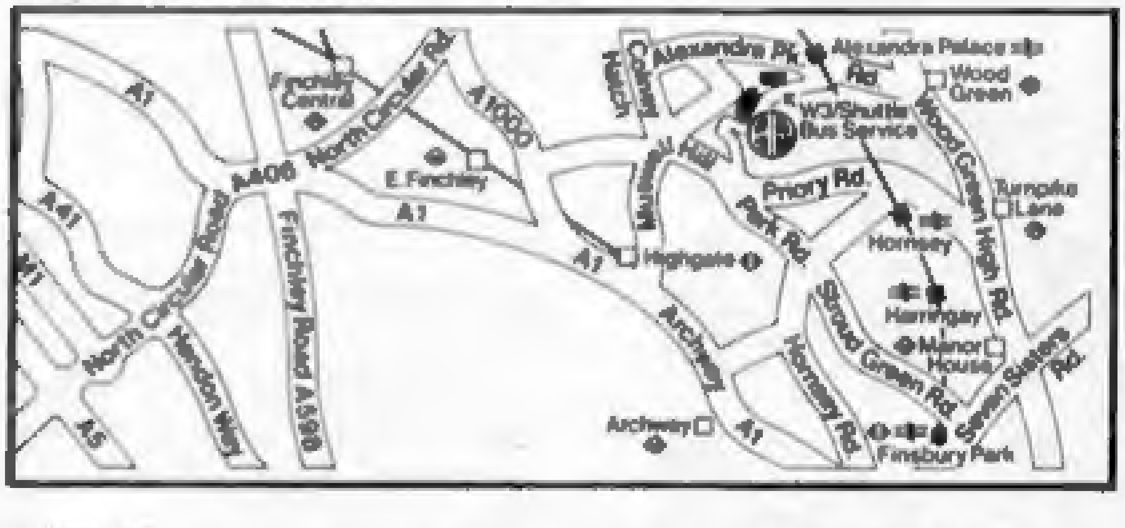
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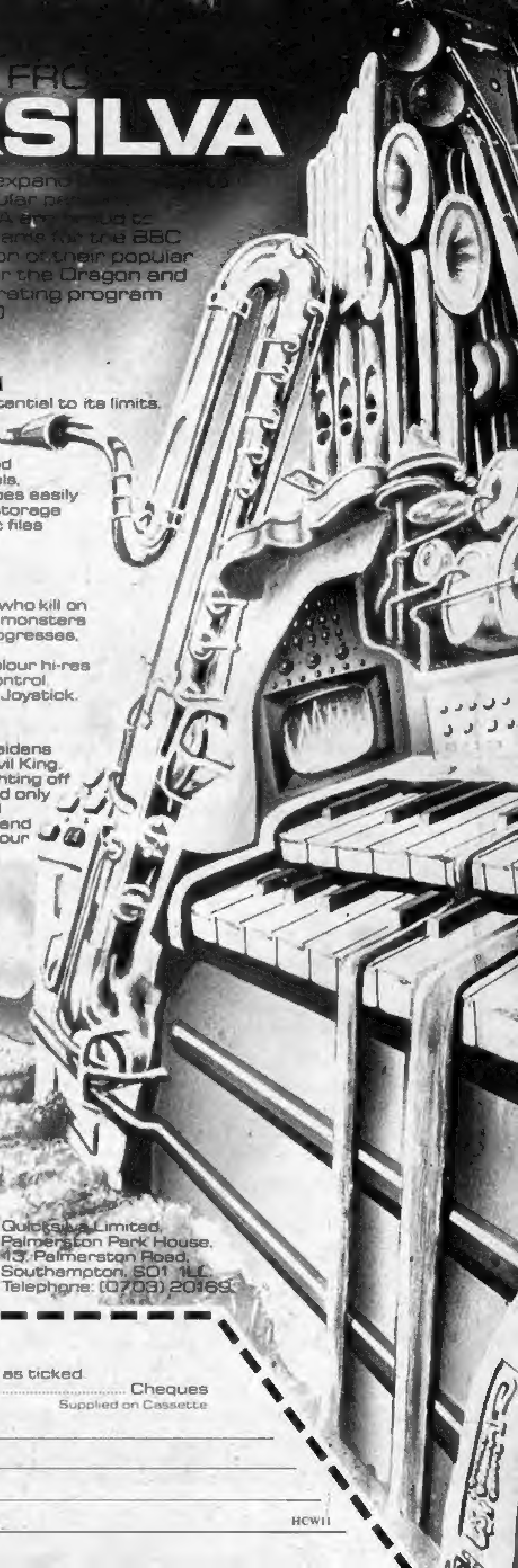

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